StarQuality Application

User Manual

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About this Manual

The StarQuality User Manual comprises the following chapters:

Chapter 1- Introduction - provides an overview of the StarQuality system and its functionality.

Chapter 2 - Installation - describes how to install the StarQuality application and use commands to start and stop it.

Chapter 3 - Getting Started - describes the structure of the interface windows, loging in, general display options, searching, the menu system, operations and navigation, editing of objects, and discovering the network

Chapter 4- Measurements - describes browsing options, display options, viewing measurement data, searching measurements and saving items as a submenu.

Chapter 5 - Setting - describes how to set the site and equipment configuration, thresholds, customizing, server configuration and management, audit trail and user administration.

Chapter 6 - Viewing Alarms - Describes the alarms and how to navigate, view and filter alarms. It also explains how to downloading data to Excel files.

Chapter 7 - Glossary

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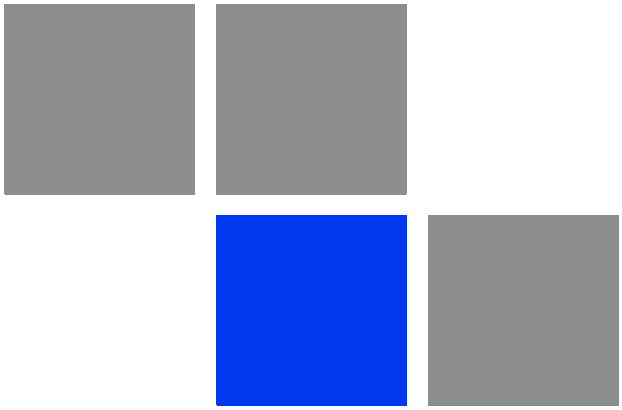
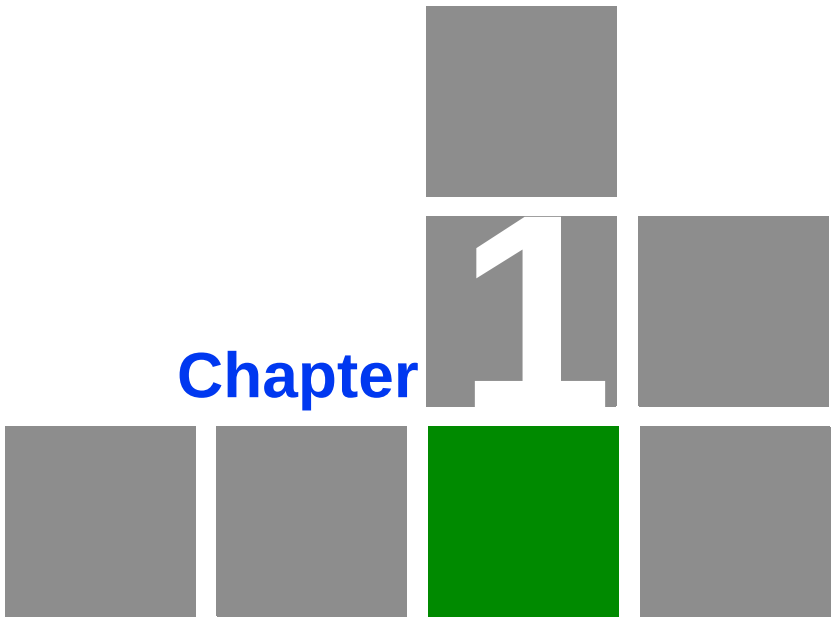




Chapter 1

Introduction

In this chapter:

- "System Overview" on page 3
- "System Data Structure" on page 4
- "Alvarion's Counters for BreezeMAX" on page 5
- "User Types and Their Settings" on page 8

1.1 System Overview

Alvarion's STARQuality is a carrier-class performance and traffic monitoring system designed for optimizing the WiMAX Network performance, identifying network problems, maximizing traffic capacity and optimizing resource allocation. STARQuality offers an end-to-end performance solution including collection, analyzing, storing and displaying of the performance data.

STARQuality provides various sets of report types and lists through an intuitive and simple Web-GUI client. It also enables defining TCA (Threshold Crossing Alerts) mechanism: an alarm generation may be conditional to the occurrence of several rule violations.

Alvarion's STARQuality is an essential element for optimizing the WiMAX Network functionality, radio planning, ensuring service performance and problem identification.

1.2 System Data Structure

The basic entities comprising the STARQuality network are:

- Equipment - also refered to as the device: BTS (or NPU) and SU. Each piece of equipment belongs to a site. This relation can be modified during the existence of the equipment.
- Basic sampled unit – SU, AU (n times in each BTS)
- Site – collection of equipments or sites. Each site can contain arbitrary many sites and equipment. Each site can reside below another site, and this relation can be modified during the existence of the site.
- Root – a virtual site – collection of sites

A bare System contains only ROOT

1.3 Alvarion's Counters for BreezeMAX

This section describes the various measurements available in STAR-Quality for BreezeMAX FDD equipment running SW version 3.5 and 3.6.

Two types of counters are available:

- Traffic Counters, providing information that can be used for analyzing capacity utilization and resources availability.
- Performence Counters, providing information on the quality of wireless links between Subscriber Units and Base Station.

1.3.1 Traffic Measurements

The STAR-Quality application retrieves traffic measurements from the managed devices every 15 minutes and calculates utilization and capacity usage for this time interval.

The following traffic counters are available for each AU/Micro Base Station.

Each counter is available for both Downlink (DL) and Uplink (UL):

Table 1-1: Traffic Measurements

Measurement	Description
MIR+CIR Allocated (bps)	The Total Maximum Information Rate (MIR for all BE and NRT services and CIR for RT and CG services) provisioned to connected SUs.
CIR Allocated (bps)	The Committed Information Rate (CIR for NRT, RT and CG services) provisioned to SUs connected to the AU/Micro Base Station.
Total Used Capacity Rate 1 (bps)	The total traffic rate* that passed through the AU/Micro Base Station using rate 1 (BPSK 1/2).
Total Used Capacity Rate 2 (bps)	The total traffic rate* that passed through the AU/Micro Base Station using rate 2 (BPSK 3/4).
Total Used Capacity Rate 3 (bps)	The total traffic rate* that passed through the AU/Micro Base Station using rate 3 (QPSK 1/2).
Total Used Capacity Rate 4 (bps)	The total traffic rate* that passed through the AU/Micro Base Station using rate 4 (QPSK 3/4).
Total Used Capacity Rate 5 (bps)	The total traffic rate* that passed through the AU/Micro Base Station using rate 5 (16QAM 1/2).

Table 1-1: Traffic Measurements

Measurement	Description
Total Used Capacity Rate 6 (bps)	The total traffic rate* that passed through the AU/Micro Base Station using rate 6 (16QAM 3/4).
Total Used Capacity Rate 7 (bps)	The total traffic rate* that passed through the AU/Micro Base Station using rate 7 (64QAM 2/3).
Total Used Capacity Rate 8 (bps)	The total traffic rate* that passed through the AU/Micro Base Station using rate 8 (64QAM 3/4).
Total Free Capacity (bps)	The predicted additional traffic rate (above the current total traffic rate) that can be passed through the AU/Micro Base Station (e.g. by deploying more SUs), assuming that the proportions of all Total Capacity Rate N counters remain the same. If you add SUs that use relatively high modulation rates, the available additional capacity will be higher then the calculated Total Free Capacity, and vice versa.
Subscription (%)	The throughput (based on the total traffic rate taking into account the unusable gap period in each frame) as a percentage of total provisioned MIR. The higher this value, the higher is the actual utilization by users of the provisioned MIR.
Predicted alloactable MIR (bps)	The predicted additional MIR that may be provisioned assuming that utilization of available MIR (Subscription MIR Percentage) remains the same.
EIR (%)	The Excess Information Rate (EIR) is the excess traffic rate (above the committed rate) that is used a user as a percentage of the total provisioned EIR (MIR-CIR). The lower the value, the lower is the actual utilization of provisioned non-committed bandwidth.
Occupation (%)	The utilization of available wireless link resources: Total used symbols during the collection period as a percentage of total symbols available.
Free (%)	Unused wireless link resources: The total unused (free) symbols (total available minus total used) during the collection period as a percentage of total available symbols.

*** Total Used Capacity Rate N calculations:**

Calculated traffic rate includes overheads which are added to basic rate traffic. It does not include fill-ins /paddings (allocations made by scheduler and frame builder in order to fill in the “holes” in the transmission) because they represent free symbols.

The calculation formula is based on the number of slots transmitted at this rate, taking into account the number of bytes per symbol at this rate at the applicable bandwidth.

The higher the Total Used Capacity at relatively low rates as a percentage of the Total Used Capacity for all rates, the higher is the traffic generated by SUs with relatively poor link quality and the lower is the overall capacity that can be supported by the AU/Micro Base Station.

1.3.2 Performance Measurements

Performance counters include the uplink/downlink RSSI (Received Signal Strength Indicator) and SNR (Signal to Noise Ration) measurements for selected SUs.

Note the following:

1. Performance measurements are done by the managed device upon SNMP requests made by the STAR-Quality application. Performance measurements for selected SUs are requested every 15 minutes, and the retrieved information includes the current values as measured following the last requests.
2. Maximum number of monitored SUs is 10 SUs per Base Station.

Table 1-2: Performance Measurements

Measurement	Description
Uplink RSSI (dBm)	The RSSI of the signal from the SU measured at the AU/Micro Base Station.
Downlink RSSI (dBm)	The RSSI of the signal from the AU measured at the SU (and reported over the air to the Base Station equipment).
Uplink SNR (dB)	The SNR of the signal from the SU measured at the AU/Micro Base Station.
Downlink SNR (dB)	The SNR of the signal from the AU measured at the SU (and reported over the air to the Base Station equipment).

1.4 User Types and Their Settings

In the StarQuality, different users can have different access rights to various objects. There is always an administrator user (admin) with the highest permission level. The individual user groups are:

- **admin user:** The user named *admin* possesses all the rights, but cannot configure preferences, and cannot create a private virtual hierarchy and charts. The default password is admin123 at installation. This user cannot be deleted from the system.

- **Administrator:** has the same rights as the *admin* user, except:

  - Cannot create, modify and delete administrator users
  - Cannot create, modify and delete servers or server groups, cannot view the operating system level user password on some computers
  - Cannot change and view the actual licences used
  - Can set preferences, and create a private virtual hierarchy and charts

- **Restricted administrators:** similar to the normal users they can only view those objects that they have received privileges for. However the restricted administrators can modify these objects:

  - Only those site, equipment, measurement, threshold, threshold type and exclusion window objects for which they have received privileges
  - Can only modify a user if it was created by themselves
  - Can only view an entry in the audit log if the change was made by themselves
  - Can only modify a public virtual hierarchy object or a public chart if it was created by themselves
  - Cannot modify templates (except the exclusion windows), reports, servers, events and maps

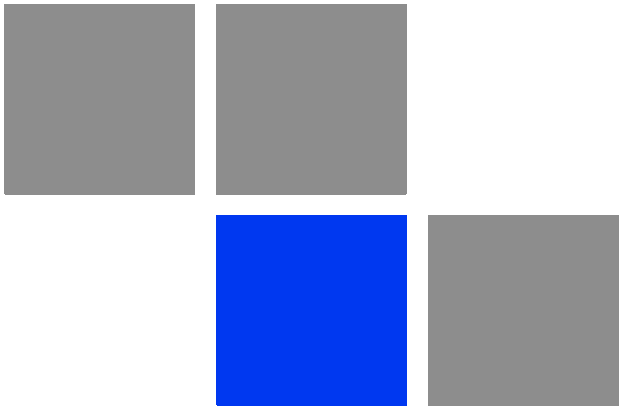
- **Normal users:** cannot modify the base objects in the system, and can view only those objects that they have received privileges for. They can set

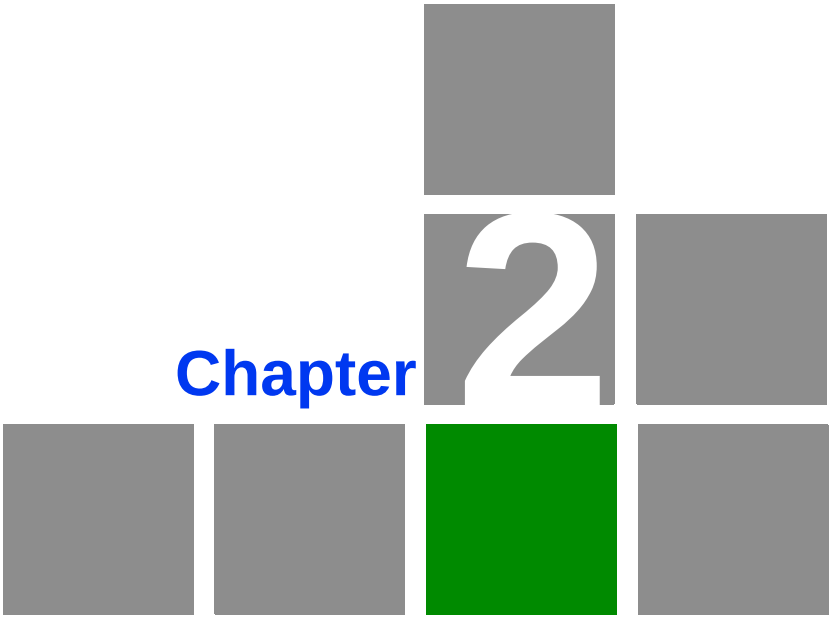
preferences, create private virtual hierarchies and charts, and can modify their own passwords

- **Limited users:** Similar to normal users, but they cannot change their passwords, cannot set preferences, and cannot create private virtual hierarchies and charts

Any administrator has the right to modify normal users, while only the admin user can modify administrators. Restricted administrators cannot modify a user except if it was created by themselves. No user can delete the admin user.

For further information, refer to the “User Types and Their Settings” on page 8.





Chapter 2

Installation

In this chapter:

- "Prerequisites" on page 13
- "Installed Components" on page 14
- "Installing StarQuality" on page 15
- "Uninstalling the StarQuality" on page 24
- "Starting and Stopping the System Using Commands" on page 25

2.1 Introduction

The installation has to be performed by an administrator user. The StarQuality service has to be stopped prior to the installation in case of upgrade.

If a previous StarQuality version is detected during installation, the installer takes the default values from that version and automatically switches to upgrade mode .

IMPORTANT

If you are running an upgrade then this does not necessarily mean that the installer would keep the StarQuality files or existing collected data. Therefore, prior to upgrade, make sure to check the release notes for version specific information.

During the installation the installer writes information into two destinations: the details view and the log file. To display the details view click the **Show Details** button. The log file is located in the TEMP directory of the user, by default the *C:\Documents and Settings\<USER>\Local Settings\Temp* directory.

2.2 Prerequisites

StarQuality can be installed on a Windows XP SP2 or Windows 2003 server using the GUI-based installer.

Prior to installation, the following is required:

2.2.1 Oracle

- Oracle version 9.2 or 10.2 and up (Oracle xe*)
- Oracle client on the STAR-Quality machine – same version as server (in case the Star quality and Oracle are on separate machines)
- Oracle Installation options:
  - Basic installation
  - Create starter database
- Database server should be running during the STAR-Quality installation
- Need to know: ip, service name, tns, password for SYSTEM user

The installer also checks this prerequisite.

2.2.2 Other Prerequisites

- Minimum 5 Giga free disk space
- Network connection
- SNMP authorized manager on measured devices (traps disabled)
- SNMP read community known

2.2.3 Hardware Prerequisites

Refer to the version specific release notes

2.3 Installed Components

The installer application installs the following components, if they do not already exist.

- cygwin - a UNIX-like environment for Windows. Operation commands must always be executed from a cygwin window.

NOTE

When using cygwin, the command starting Apache - `/usr/sbin/apachectl` will stop Apache if the cygwin window is closed. Therefore, it is recommended to login locally with the `ssh` command, start Apache, and only then close the window.

- Java jre
- Apache

2.4 Installing StarQuality

1 Run the installation program *starquality.exe*; The installation wizard is displayed.

StarQuality Setup
Welcome to the StarQuality Setup Wizard
This wizard will guide you through the installation of StarQuality.
It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.
Click Next to continue.
Next >
Cancel

Figure 2-1: StarQuality Setup Wizard Window

2 Click **Next**; the wizard displays components to install. The installer will install the Cygwin as well, if it is not already installed . If it is installed, the installer checks for the required Cygwin modules and launches the Cygwin installer if one of them cannot be found.

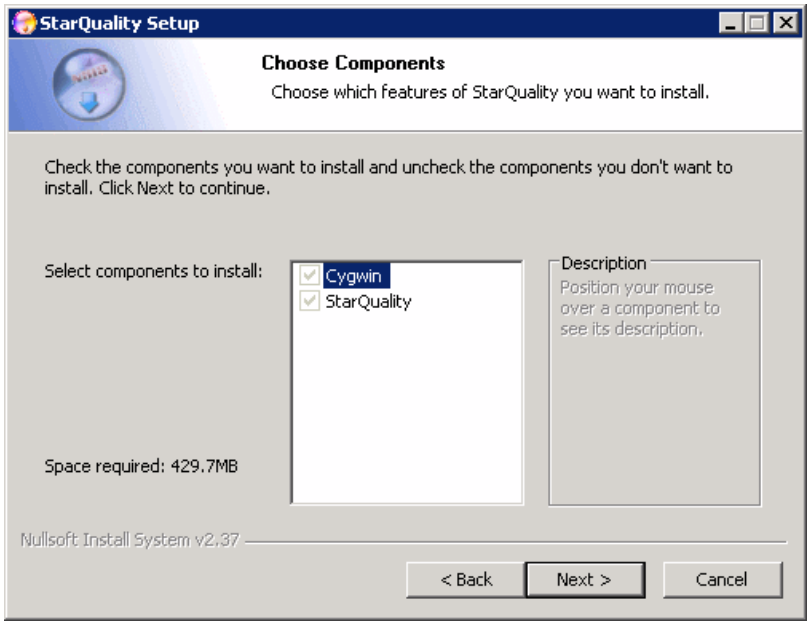

StarQuality Setup
Choose Components
Choose which features of StarQuality you want to install.
Check the components you want to install and uncheck the components you don't want to install. Click Next to continue.
Select components to install:
Cygwin
StarQuality
Description
Position your mouse over a component to see its description.
Space required: 429.7MB
Nullsoft Install System v2.37
< Back
Next >
Cancel

Figure 2-2: Choose Components

3 Click **Next**. If the Cygwin has not been installed yet, the installer displays the Choose Install Location page. If it already has been installed, the application will be installed in its directory.

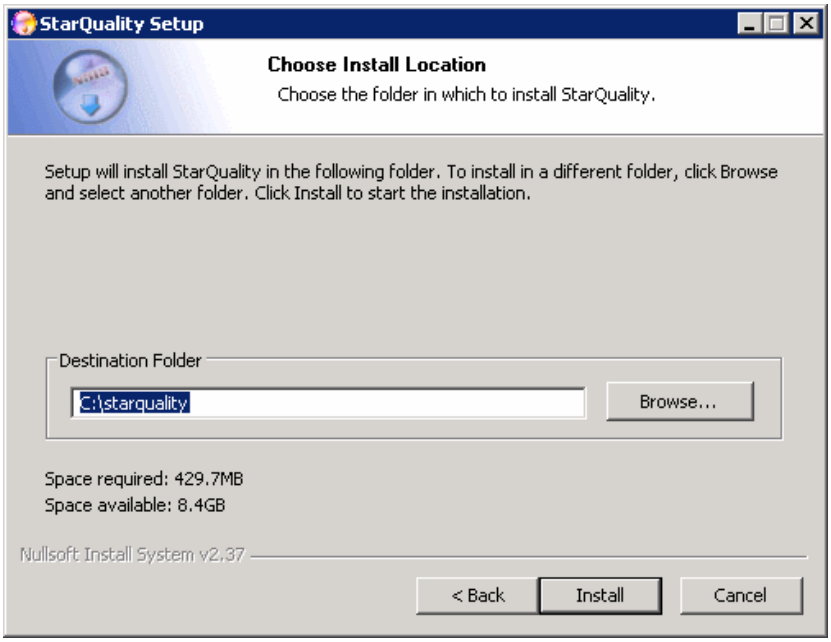

StarQuality Setup
Choose Install Location
Choose the folder in which to install StarQuality.
Setup will install StarQuality in the following folder. To install in a different folder, click Browse and select another folder. Click Install to start the installation.
Destination Folder
C:\starquality
Browse...
Space required: 429.7MB
Space available: 8.4GB
Nullsoft Install System v2.37
< Back
Install
Cancel

Figure 2-3: Choose Install Location

4 Click **Install**. The Cygwin Setup only appears if one or more Cygwin modules need to be installed. The Cygwin installer does not require any user input. If the Cygwin install fails for any reason, an error message appears describing how to manually install the Cygwin.

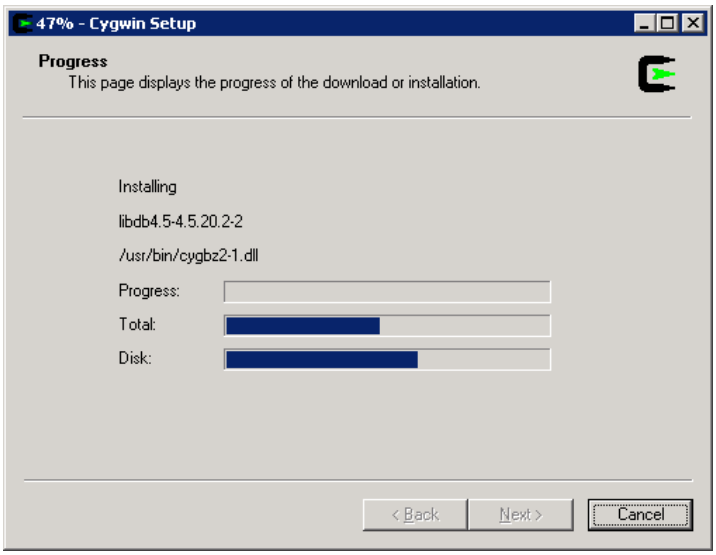


Figure 2-4: Cygwin Setup

5 Click **Next**; StarQuality installation starts. To view detailed information click **Show Details**. The content of the details view can be copied to the clipboard.

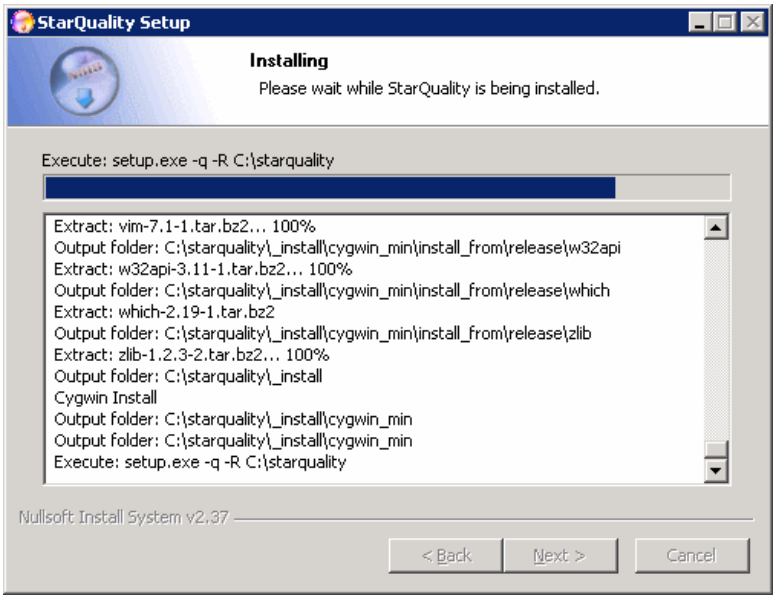


Figure 2-5: StarQuality Installing

The last page indicates that the basic installation is done.

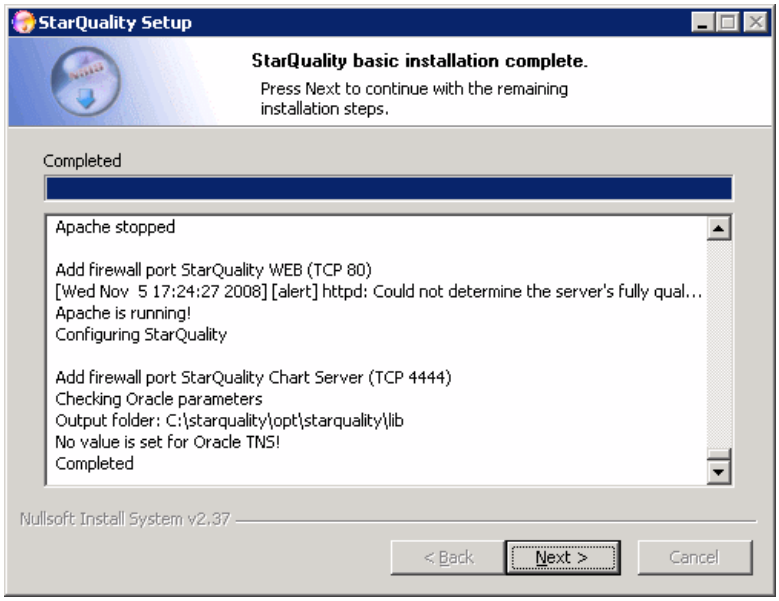

StarQuality Setup
StarQuality basic installation complete.
Press Next to continue with the remaining installation steps.
Completed
Apache stopped
Add firewall port StarQuality WEB (TCP 80)
[Wed Nov 5 17:24:27 2008] [alert] httpd: Could not determine the server's fully qual...
Apache is running!
Configuring StarQuality
Add firewall port StarQuality Chart Server (TCP 4444)
Checking Oracle parameters
Output folder: C:\starquality\opt\starquality\lib
No value is set for Oracle TNS!
Completed
Nullsoft Install System v2,37
< Back
Next >
Cancel

Figure 2-6: Installation Complete

6 Click **Next**; the installer checks the additional tasks and shows only the relevant pages. If this is only a software upgrade of an already successfully installed StarQuality, only one additional page is displayed, and if a database schema upgrade is required, the installer prompts for it.

7 If the StarQuality Windows service has not been registered yet, the StarQuality Windows Service Registration window is displayed. The service will be run with the given Windows user: the installer automatically fills in the current user name, but if this user is not a local user but a domain user, then the dot (.) should be replaced with the domain name, for example: DOMAIN\Alvarion.

IMPORTANT

If the user name is changed then the StarQuality service will not function

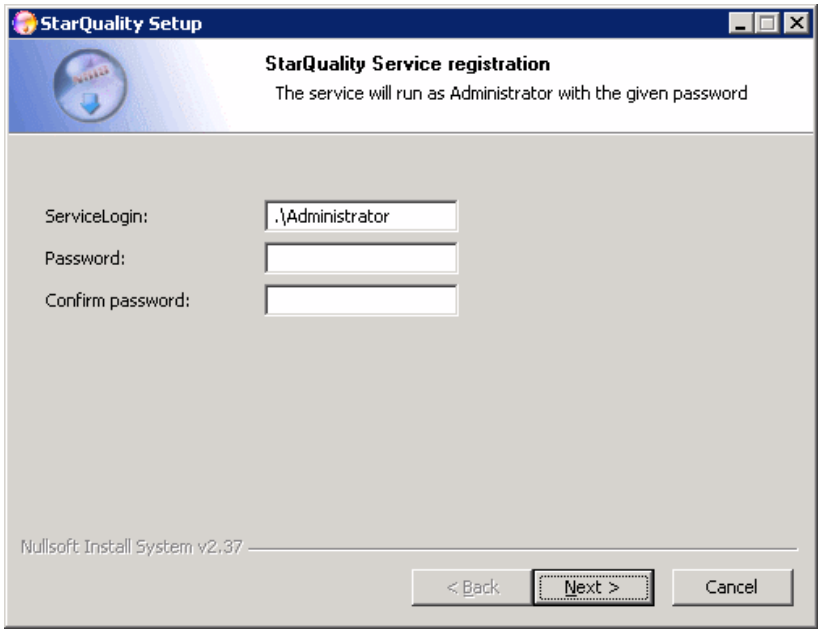


Figure 2-7: StarQuality Windows Service Registration

8 Click **Next**; The Oracle Connection page is displayed.

If the page is shown for a previously installed StarQuality, the installer takes the default values from that installation. If it is a new installation, then it tries to detect the value for the Oracle home and sets the port to the common value (1521). All other values have to be filled in:

- **TNS:** the TNS name to be used for the database connection.

IMPORTANT

The installer does not configure the *tnsnames.ora* file; The users have to do it manually.

- **Host and port:** the host and port used for the database connection. Port default is 1521. Host can be either:
  - » Localhost (in case that StarQuality and Oracle are on the same machine)
  - » Hostname
  - » IP
  - » 127.0.0.1 (in case that StarQuality and Oracle are on the same machine)
- **Service name and SID:** only one of them needs to be filled in, preferably the Service name.
- **System password and Confirm password:** the password of the SYSTEM user in the database. The password is only used by the installer for the creation of the database user and table spaces, the installer does not store it.

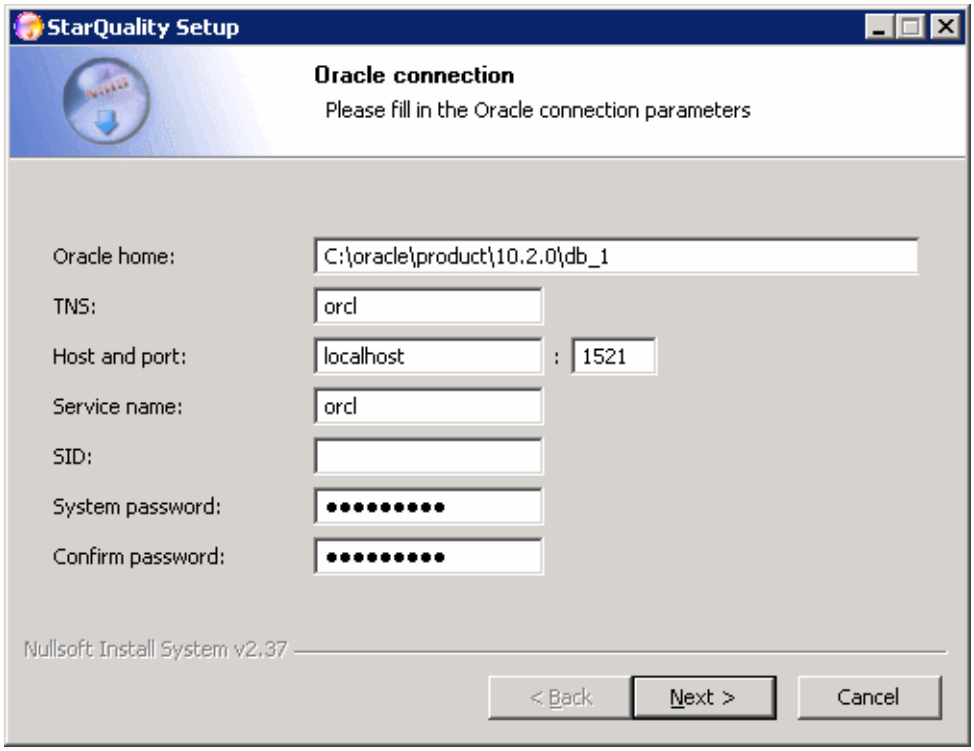


Figure 2-8: Oracle Connection Parameters

This page is not shown during the upgrade of an already successfully installed StarQuality. However if the installer detects some problem (for example the database user does not have the necessary rights) then the Oracle pages are

shown. If this is the - the installer tries to recreate the database schema and run the upgrade scripts.

NOTE

During these steps the installer does not delete data from the database, therefore probably no damage is expected even if running on an already existing database schema; however database backup is recommended before continuing.

9 Click **Next**; Oracle Connection continues with Oracle tablespace parameters. If a tablespace already exists, specify whether it can continue or not. If the answer is yes, and it was created by a previous StarQuality installer, the uninstaller will offer dropping of that tablespace.

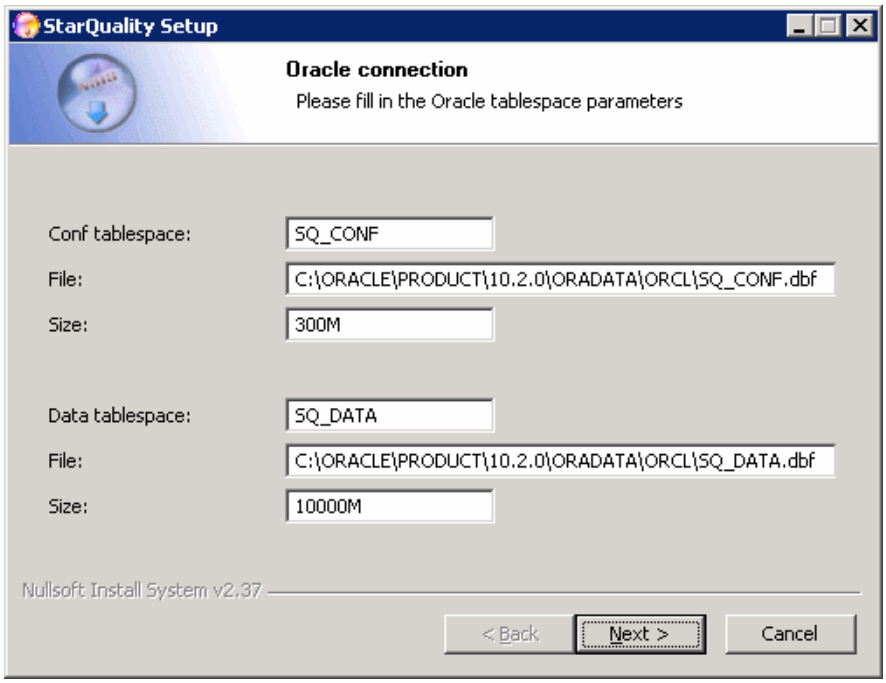


Figure 2-9: Oracle Connection - Tablespace Parameters

10 Click **Next**; Oracle Connection continues with Oracle user parameters Similar to the previous page: if the user already exists, the installer asks whether it can continue or not. If the answer is yes and it was created by a previous StarQuality installer, the uninstaller will offer dropping of that user.

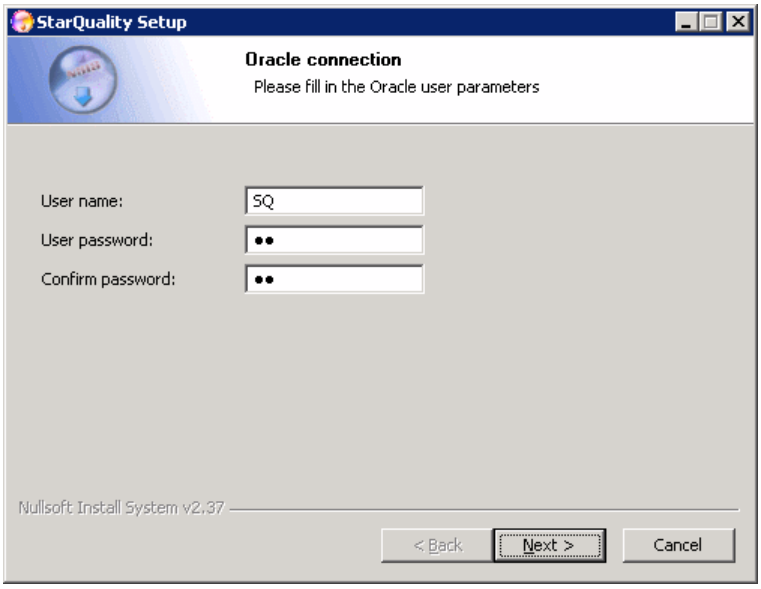


Figure 2-10: Oracle Connection - User Parameters

11 Click **Next**; The installer displays the Setup wizard and completes the installation.

If you are running a software upgrade, a warning appears before this page if the installer needs to perform some database schema upgrade.

Figure 2-11: StarQuality Setup Wizard - Completing Installation

12 Click **Finish** to close the wizard.

13 Upload the license file on the WEB GUI in order to be able to start StarQuality service. Failing to do so may cause the Apache WEB server to stop as well.

If this has occurred, start the Apache WEB server manually: open a new Cygwin shell using the Cygwin icon on the Desktop and issue the following command to start the WEB server:

```
/usr/sbin/apachectl start
```

2.5 Uninstalling the StarQuality

The uninstallation can be initiated by running the *UninstallStarQuality.exe* in the Cygwin root directory or by using Start > Settings > Control Panel > Add or Remove Programs.

During the uninstallation the application asks whether it should delete the different components. If you want to keep a module which is dependent on another module, the application will not even ask to remove the other module. For example if you do not want to remove the *bash symbolic* link, it will not remove the Cygwin installation.

The only exception to this rule is the Oracle user: if you want to keep it, you can choose so, but nevertheless the application will be uninstalled. The uninstaller is only able to drop the Oracle user and the tablespaces if the user fills in the SYSTEM password as shown below:

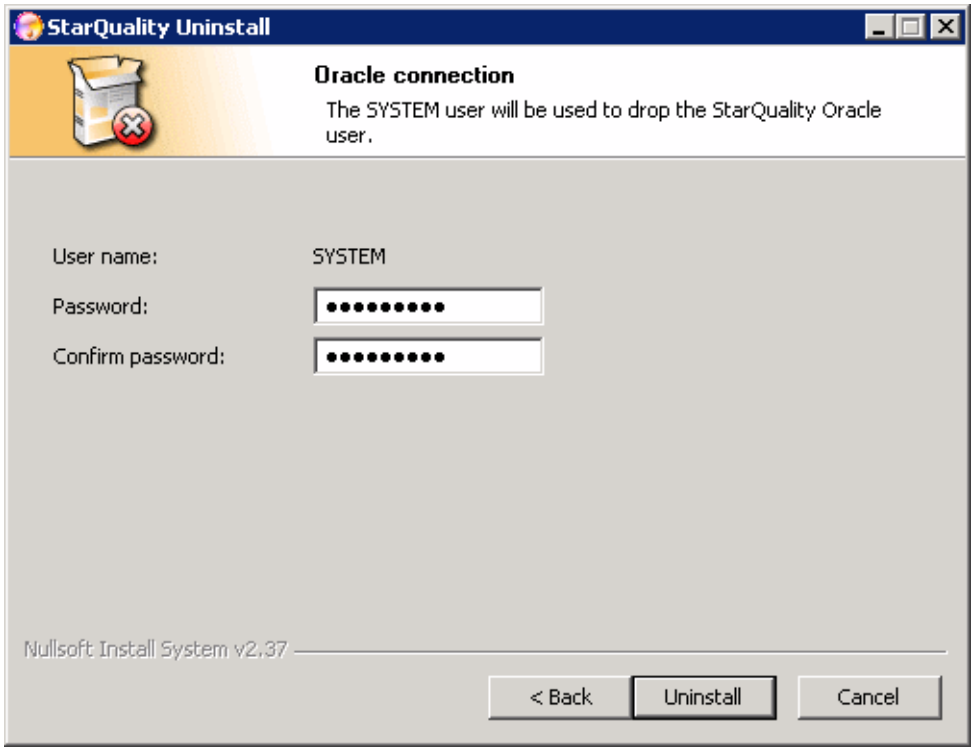


Figure 2-12: Uninstalling the Oracle User

2.6 Starting and Stopping the System Using Commands

To start the server:

Open a cygwin shell and enter the commands:

```
/usr/sbin/apachectl start
/opt/starquality/bin/start_stop_pvsr start
```

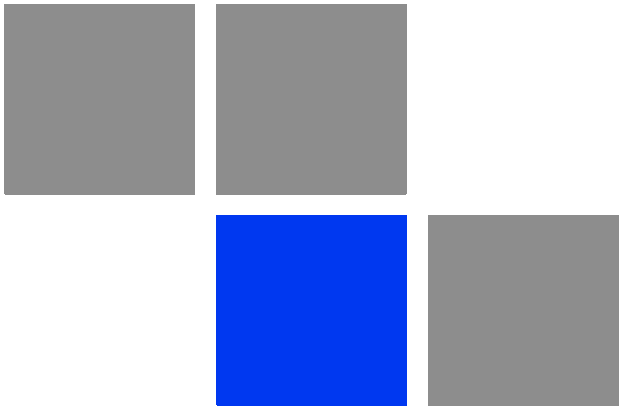
NOTE

If the Apache is started this way, the cygwin shell should remain open. Closing it will cause the Apache service to shut down.

To stop the server:

Open a cygwin shell and enter the commands:

```
/usr/sbin/apachectl stop
/opt/starquality/bin/start_stop_pvsr stop
```



Chapter 3

Getting Started

In this chapter:

- "Login" on page 28
- "The Structure of Interface Windows" on page 30
- "General Display Options" on page 31
- "On Searching in General" on page 33
- "The Menu System" on page 34
- "Operations and Navigation in the Hierarchy" on page 39
- "Editing of Objects" on page 41
- "Discovering the Network" on page 42
- "Examples of Network Mapping" on page 46

3.1 Login

10 working clients may simultaneously use the system. Using the system is possible with the following web browsers:

- Microsoft Internet Explorer
- Mozilla Firefox

To start a client session with StarQuality:

1. Open a web browser and go to http://<ip or hostname>/.
2. Enter User Name and Password. The default admin users credentials are:

   `admin`

   `admin123`

   The StarQuality opening window is displayed for a few moments and then the main interface window opens (see Figure 3-1).

3. If a warning appears prompting for a license missing, load a license file (provided separately):
   a. Place the licence file on the computer from which you activated the client.
   b. From Settings select Servers; the Servers tab is displayed.
   c. Select Licenses from the Browser. The Licences Configuration window is displayed.
   d. Click [Add new] and browse for the file containing the license.
   e. Click OK
   f. Select Start/Stop/Status from the Browser and verify that all the servers are up. If not - click eithe Start all or Start next to one server.
4. You can proceed with discovering the network (see "Discovering the Network" on page 42) or start monitoring the equipment.

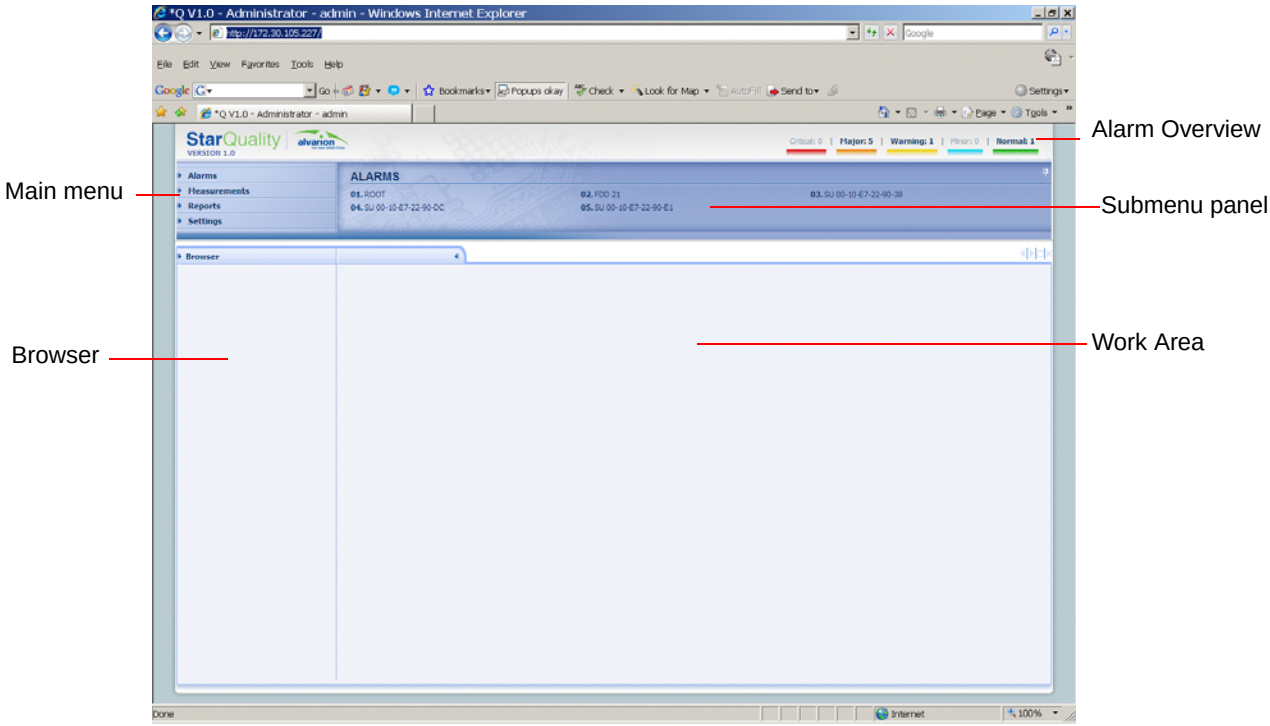


Figure 3-1: The StarQuality User Interface

3.2 The Structure of Interface Windows

The interface of the StarQuality application divides the browser window into several panels (see Figure 3-1):

- **Alarm overview bar** - displays current alarms, grouped by their severity level. This also acts as a shortcut to the alarm screens. The application displays only alarms that the user has permissions to view. If access to alarms is unavailable, the bar is completely missing.

- **The main menu** - contains the main operation tasks of the system: Alarms, Measurements, Reports, and Settings. Selecting each item on this menu opens various submenus and groups displayed in the submenu panel and in the browser. For detailed structure, refer to "The Menu System" on page 34.

- **Submenu panel** - the submenus under the selected menu item are displayed on the adjoining right hand side panel. This panel can be scrolled (up and down) using the arrows on its right edge. The submenu structure displayed here can be customized in order to accelerate the execution of frequently repeated navigation steps.

- **The browser** - located on the bottom left side of the user interface. The browser can contain further submenu items and special menu groups based on the chosen menu items in the upper menu system.

  Non-administrator users can only view those alarms/pieces of equipment/sites for which they have permissions. Refer to "User Types and Their Settings" on page 8.

  The user name and type appears in the title of the web browser window.

3.3 General Display Options

3.3.1 Scrolling or Hiding the Submenu Items

- If the name of a menu item is too long to display, it is abbreviated. To view the entire text as a tooltip, move the mouse pointer over it.
- To hide the entire menu system, click on the icon at the top-right corner of the panel (Figure 3-2). In this case the component can only be viewed if the mouse pointer is placed above it.
- To cancel the automatic hiding of the panel, click on the hiding icon again.

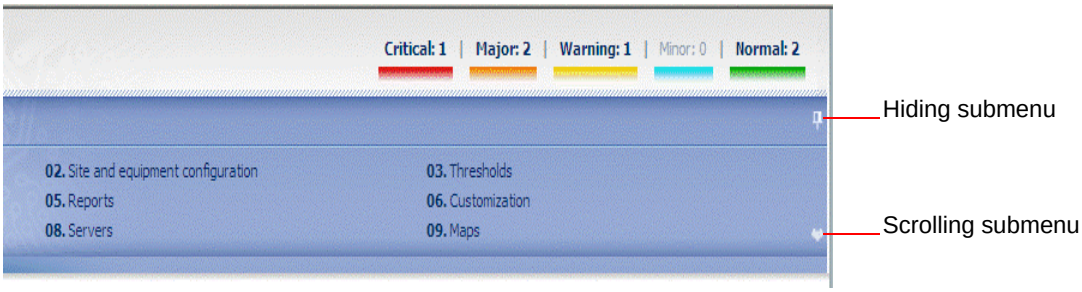


Figure 3-2: Scrolling and Hiding the Submenu

3.3.2 Using the Display Tabs

You can work with several open pages at the same time. The current page or pages currently in use are displayed as tabs. You navigate the opened pages with the tabs on the top of the pages. The selected page always comes up in the front. The tabs can also be scrolled horizontally.

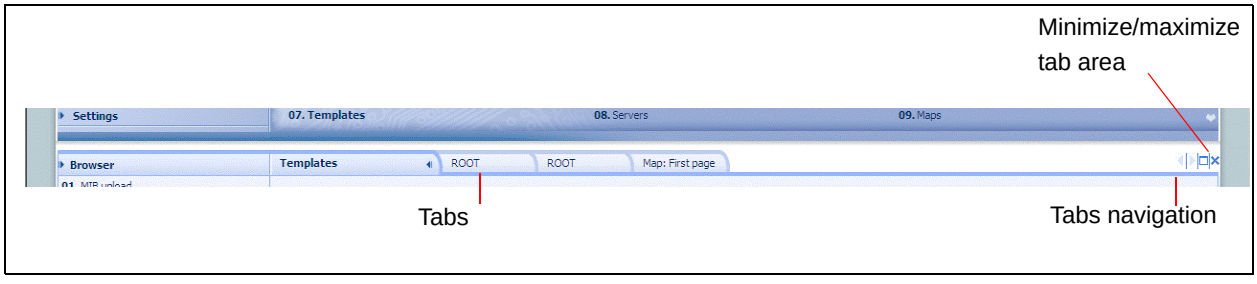


Figure 3-3: Navigation Tabs

When a page is put in the background, the browser window stores its content that is subsequently restored when the user chooses to display that page again.

If you select a menu item, the requested page is displayed instead of the current page. However, it is also possible to load the new page in a new tab. This is the default option when using the Alarms fast menu, while in the configurable menus you can select whether the new page should be displayed in a new or in an already existing tab.

To set the tab display options:

Use the following options to set the tabs display:

Table 3-1: Setting the Tab Display Options

To	Do this:
Select the tab display mode	Right-click on the menu items and select either “Open in a new tab” or “Open in tab: <already existing_tab_name>”.
Rename the tab	Click the tab title, type the name and press Enter.
Maximize/minimize the page to entire window	Use the icon at the top-right corner (see Figure 3-3)

3.4 On Searching in General

Search strings are entered frequently in the StarQuality application in order to search by text or to filter the results. There are two types of searching methods: the complex search system, accessed from the Search menu item, and the simple filter system, used in other places.

For the Search menu item, the StarQuality application performs character based, case insensitive “whole text” matching.

Four special characters can be used in the search string:

- _ (underline) or ? (question mark): matches an arbitrary character
- % (percentage) or * (asterisk): matches zero or more arbitrary characters

Therefore, for example, the “_apple%” search string results in all names whose second to sixth characters are “apple” (regardless of case), followed by an arbitrary string of characters, that is, for example “Xapple123”, “aApPle”, “1AppleTree”, etc.

In other cases (filtering, charts editing, etc.), the StarQuality distinguishes small and capital letters, but the [?] and [*] characters do not have the special meaning mentioned above.

3.5 The Menu System

The following sections describe the main menu, the submenus under it and the menu items and groups appearing in the browser:

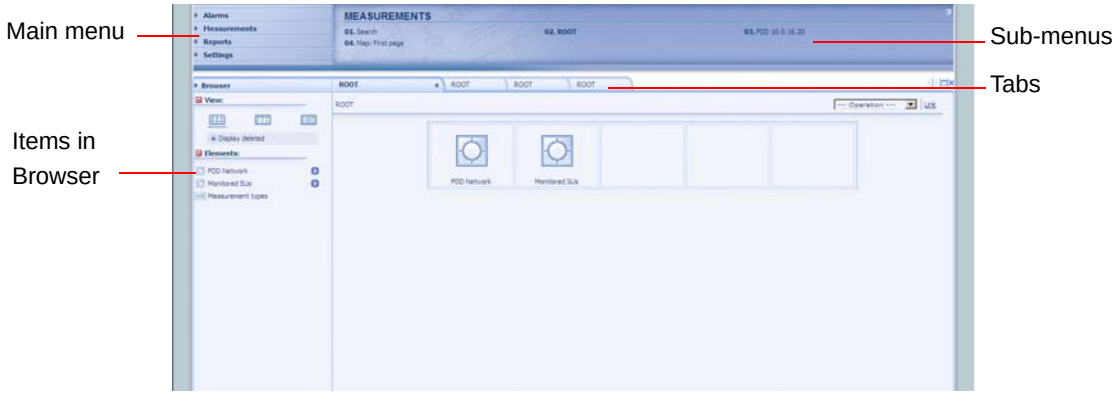


Figure 3-4: Example of Menus, Submenu Panel and Browser (in Measurements Menu)

3.5.1 Measurements

- In the submenu panel:
  - **Search** for sites, equipments, measurements and charts on the basis of several parameters (see “Searching Measurements” on page 55)
  - Public and private menu items, for viewing the measurements below the chosen menu item
- In the Browser:
  - **View** menu group**:** Selecting the mode of display for the measurements (see “Measurements Display Options” on page 52)
  - **Chart Settings** - displaying the measurement values causing the alarms
  - **Elements** menu group**:** Sorting and filtering of the measurements. This menu contains a site-equipment hierarchy based navigation tree. The root of the hierarchy is determined by the originally selected menu item. The

panel containing the menu group can be scrolled. (see “Viewing Measurement Data” on page 54)

- Element name, e.g. <FDD Network> - If the list contains too many elements, they are grouped by the system, using links pointing to the sublists. This is an example of a group of elements
- Monitored SUs - example of a group of elements
- Measurement Types - for filtering the measurements by their types

3.5.2 Alarms

- In the submenu panel: Public and private menu items, for viewing the alarms below the chosen menu item
- In the Browser:
  - **Time span** menu group: Choosing the alarms related to a given time interval: Real time - 5 min., Historical - by date (full days), hours (see “Viewing Alarms by Time Span” on page 129)
  - **View** menu group: Choosing the display mode for the alarms (see “Alarm View Options” on page 129)
  - **Filters** menu group: Filtering of the alarms to be displayed (see “Filtering Alarms” on page 132)

3.5.3 Reports

Naming the configured reports: Viewing the selected reports

Calendar: The reports are displayed with respect to the time interval selected in the calendar

3.5.4 Settings

For each item in the submenu panel, different items appear in the Browser. For non-administrator users, the submenus used to make changes are not displayed, and the other submenus are displayed selectively based on the access rights of the user.

- **Search:** Searching the configured objects based on various parameters [see “On Searching in General” on page 33).

- **Site and equipment configuration:** Configuring basic and virtual sites and equipment objects
- **Thresholds (admin only)** (see “Thresholds” on page 73):
  - **Configuration:** Configuring the thresholds. The thresholds of measurements of the given equipment only can also be configured in the menu group of the default equipment.
  - **Types:** Editing the threshold types
- **Scheduled configurations:** Automatically scheduled configurations that the Job queue module could not yet execute successfully
- **Reports (admin only)**:
  - **Report variables:** Defining the variables used for reports
  - **Report views:** Creating reports by selecting variables
  - **Scheduled reports:** Setting scheduled report delivering
- **Customization:** editing of “public” objects refers to the administrator users, while editing of “private” objects refers to the rest of the users (“Customization” on page 93):
  - **Public/Private charts:** Configuring charts (see “Configuring Public and Private Charts” on page 98)
  - **Public/Private menu items:** Defining menu items for the submenu panel (see “Customizing Public and Private Menu Items” on page 96)
  - **External links (admin only):** Setting the external links to display for basic or virtual site and equipment objects (see “Setting E-mail Addresses” on page 104)
  - **Preferences (non-administrator users only):** Configuring displaying preferences (see “Customizing Display Preferences” on page 93)
  - **E-mail addresses:** A list of the e-mail addresses of the users (see “Setting E-mail Addresses” on page 104)

- **Templates (admin only)** :
  - **MIB upload:** Not applicable
  - **Measurement type definitions:** Not applicable
  - **Equipment templates:** Not applicable
  - **Threshold templates:** Editing threshold templates (see “Creating Threshold Templates” on page 87)
  - **Chart templates:** Editing chart templates (see “Viewing Charts ” on page 104)
  - **Exclusion window template:** Defining time frames in which thresholds can be activated/deactivated
- **Servers (admin only)** (see “Server Configuration and Management” on page 105):
  - **Licences:** Displaying and configuring the currently used and available licences
  - **Device and measurement summary:** Viewing the list of all basic equipments, and the number of objects in the system for each measurement type
  - **Server groups:** Configuration of individual measuring groups
  - **Server configuration:** Modifying the measurement servers and other servers
  - **Start/Stop/Status:** Remote management of individual servers
  - **Server events:** Viewing the events that occurred during self-testing
  - **Collector load:** Viewing the load of the collectors and listing the unsuccessful measurements at a given date.

- **Maps (admin only)**:
  - **Creation:** Adding new charts
  - **Modification:** Editing charts
  - **Deletion:** Deleting configured charts
- **Audit trail (admin only):** Displaying the individual configuration modifications
- **User**:
  - **User admin (admin only):** Adding, deleting and modifying users
  - **User rights (admin only):** Configuring which privileges/permissions the users should possess
  - **Password:** Changing password

3.6 Operations and Navigation in the Hierarchy

In Alarms, Measurements and Reports pages (and also under the Settings > Site and Equipment Configuration submenu) there are three elements at the top of the page. These fields are always visible (even if the page is scrolled):

- The **Operations** pull down menu (located at the top-right), contains different options depending on the current object and menu item (see Figure 3-5):
  - » Fast navigation between the menu items while keeping the actual location within the hierarchy; for example, immediate opening of the measurement charts form the equipment configuration.
  - » A Print option for Alarms, Measurements and Reports, because this is the only possible way to print the full content of the main display area (the basic print function of the browser is not suitable for this)
  - » For Measurements, an option to save the current object as a menu item

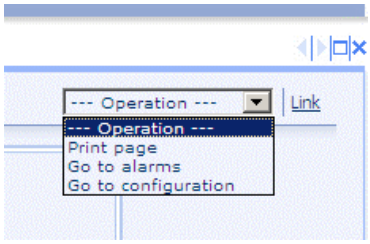


Figure 3-5: Operations pull down menu

- A path (at the top-left) showing the current location within the hierarchy. It is always possible to click on the elements of this list, except for the last one, and return to a higher hierarchy level.

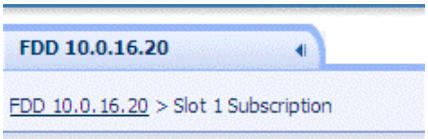


Figure 3-6: Hierarchy Path

If during the navigation you access an equipment through one of its virtual sites then after any equipment modification you cannot get back to that point in the virtual hierarchy, because the application will modify the current location according to the normal hierarchy, i.e. it will show the equipment under its parent site.

Notice that by using the fast navigation between the menu items (see the above bullet), the current location within the hierarchy might change: although the page will show the selected object, the path shown to the root object might be incorrect.

- For Alarms and Measurements, a **Link** option is also displayed at the top-right of the window, enabling a creation of a direct URL on the interface that can be used to open the current object directly in a new browser window.

3.7 Editing of Objects

In the Settings menu you can edit the various objects of the system. This section explains the general editing principles of the system. The various possibilities of editing different kinds of objects are discussed in detail in the corresponding sections.

The list of editable objects is displayed in a table that, with the exception of the Site-equipment-measurement Configuration page, contains the most important attributes of the objects.

To edit objects:

Use one of the following options, when available:

Table 3-2: Editing Objects

To	Do this:	Comments
Delete an object (only if it has no sub-elements)	Click [del]	The system always prompts to confirm the action before it is executed.
Modify an oblect	Click [edit] and modify the parameters	Click OK or Cancel
Create a new simple object	Click [add new]	
Create objects based on a template	Click [from template]	
Create objects based on another object	Click [copy from]	
Perform other editing operations	Use the pull down menu available on the screen	Applicable in case of normal and virtual sites.

3.8 Discovering the Network

At first login, the system contains only a ROOT site. You build your new network under the ROOT to be able to start monitoring your equipment performance using the STARQuality.

Mapping the network in StarQuality can be done using various structures, such as by geografical locations, by topics, etc,. This section describes the creation of a unified network (named "FDD Network") and all the BTSs under it. In addition, you can find examples of other mapping examples (see "Examples of Network Mapping" on page 46).

For more information on configuration, refer to Chapter 5 - "Settings" on page 59.

The measurements can be viewed not less than 30 minutes following the initial collection for each device.

To create the FDD network site under ROOT:

1. From Settings select Site and Equipment Configuration.
2. From the Creation dropdown menu select Create New Site
3. Fill in the site name (free text), its description (optional), the corresponding icon and WiMAX FDD server group. Click **OK**. The FDD Network is created under the ROOT.

3.8.1 Discovery of Devices under "FDD Network"

This section describes adding BTSs to the network and initiating the data collection from them. SUs data collection is not yet activated at this stage.

To add BTSs under the network:

1. If not already set, from Settings select Site and Equipment Configuration.
2. Click the FDD Network icon to enter its site.

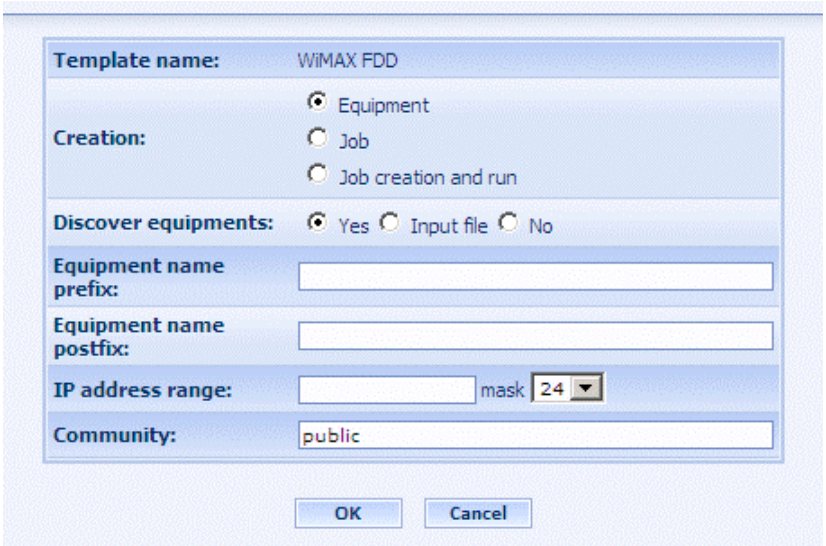


Figure 3-7: Creating New Equipments from Template

3 From the Creation drop down menu select Add Equipments from Template.

4 Override the SNMP Read Community setting with the relevant one for your network.

5 In the Discover Equipments field select either: No - to add equipments manually or Input File - to upload a CSV (Comma Separated Values) file. (The Yes option is not applicable)

NOTE

Searching and displaying of devices in StarQuality is done by names only, therefore it is advised to keep a systematic naming convention

6 If you selected No:

- **a** Click OK ; the system returns to the main network list.
- **b** Click [Add new] to add as many equipments as required.
- **c** In each line enter BTS name (free text up to 46 characters), IP address, and description. Name and IP address are mandatory.

7 If you selected Input File:

- **a** Prepare a text file, with three columns in the following order: equipment name, equipment description and IP address.
- **b** In the StarQuality application clock Browse to find this file

c Click OK; the system returns to the main network list, loaded with device data from the uploaded file. You can edit this list as required.

8 Click OK; the system searches and discovers each existing and online BTS. For each discovered BTS a success message appears; For each unsuccessful discovery an error massage is displayed and the system goes on to the next device.

9 When the discovery is complete, click Back to return to the FDD network site.

10 Verify that all the equipments are not colored red, which means that their data is being collected.

11 Verify that for each BTS a matching virtual site has been created, named as the BTS with the postfix "SUs" (i.e, <btsname SUs>), and is colored red, which means that not all the SUs under it are being collected yet.

3.8.2 Activation of Data Collection for SUs

SU performance collection is limited by the system to 10 SUs per BTS. Activation is done from within the SUs virtual sites, which should be entered manually one by one.

All the SUs that are collected are also linked to an automatically generated virtual site named "Monitored SUs" placed under ROOT.

To activate data collection for SUs

1 Click the SU-virtual-site icon to enter the site.

2 Choose up to 10 SUs you wish to collect data from and repeat the following for each one:

a Click [edit] next to the SU you want to activate.

b Select the Collect Data checkbox at the bottom of the upper table

c Click OK.

d Go back one level in the navigation path and verify that the SU line is no longer red (Figure 3-8).

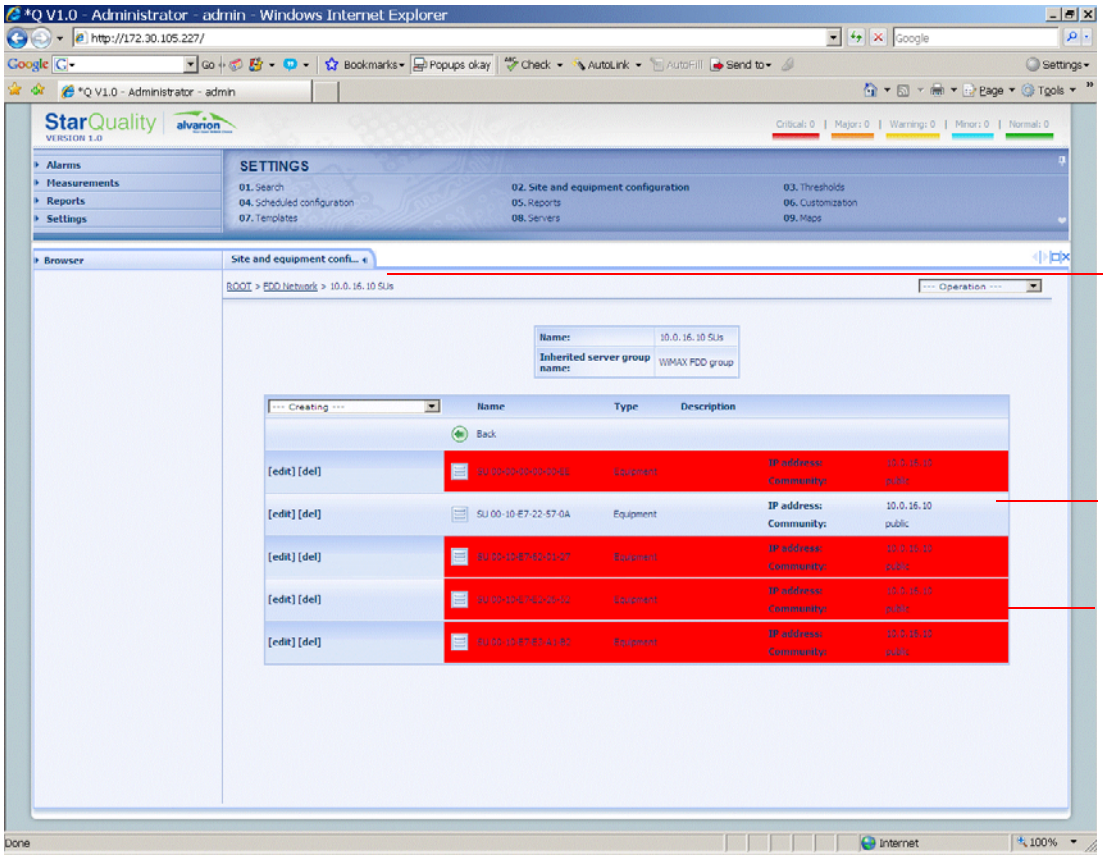


Figure 3-8: SUs Data Collection Status

3.9 Examples of Network Mapping

1 BTSs and SUs under Root:

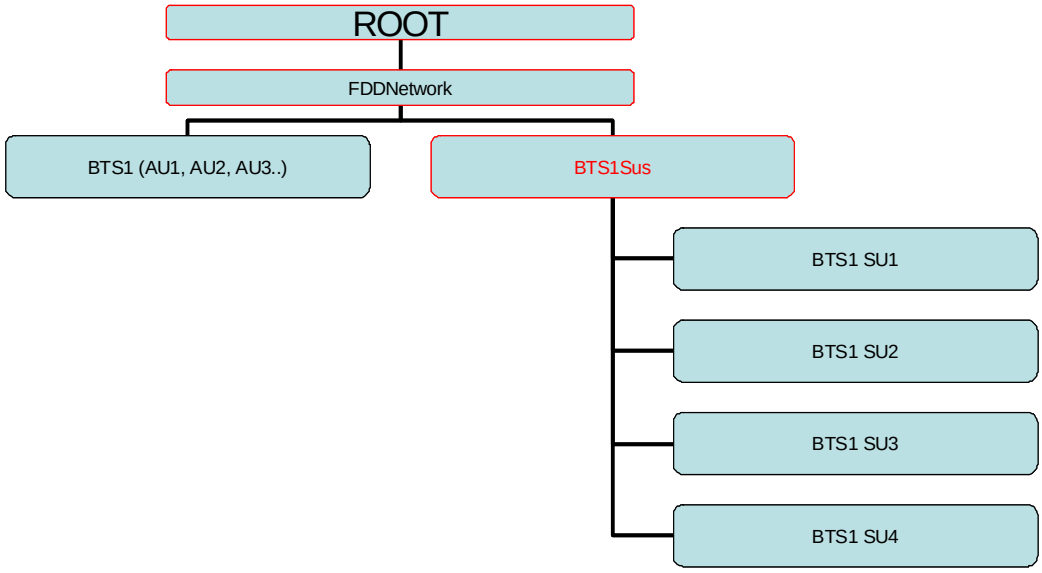


Figure 3-9: Before Data Collection Activation

Upon data collection activation, the Monitored SUs site is added:

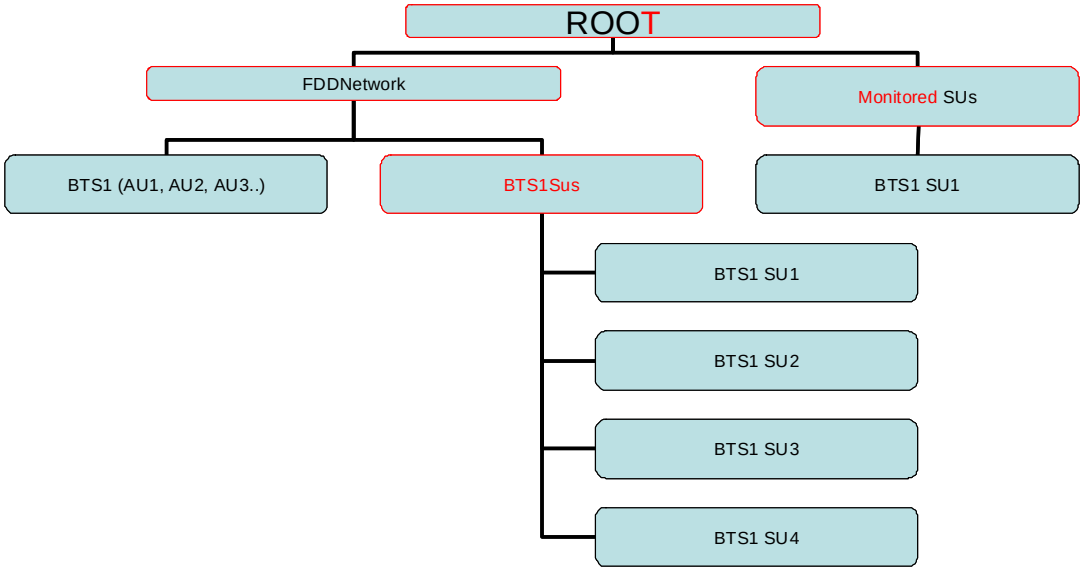


Figure 3-10: After Data Collection Activation

2 Mapping by geographical locations under ROOT

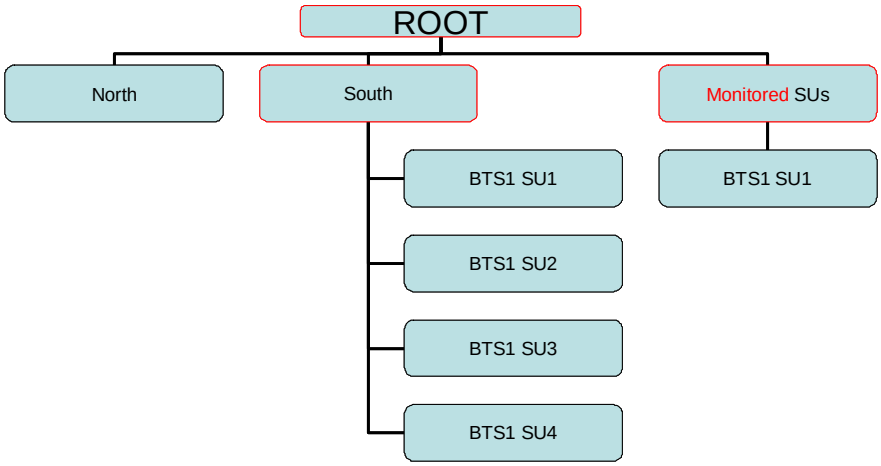


Figure 3-11: Geographical Mapping

3 Mapping by facilities

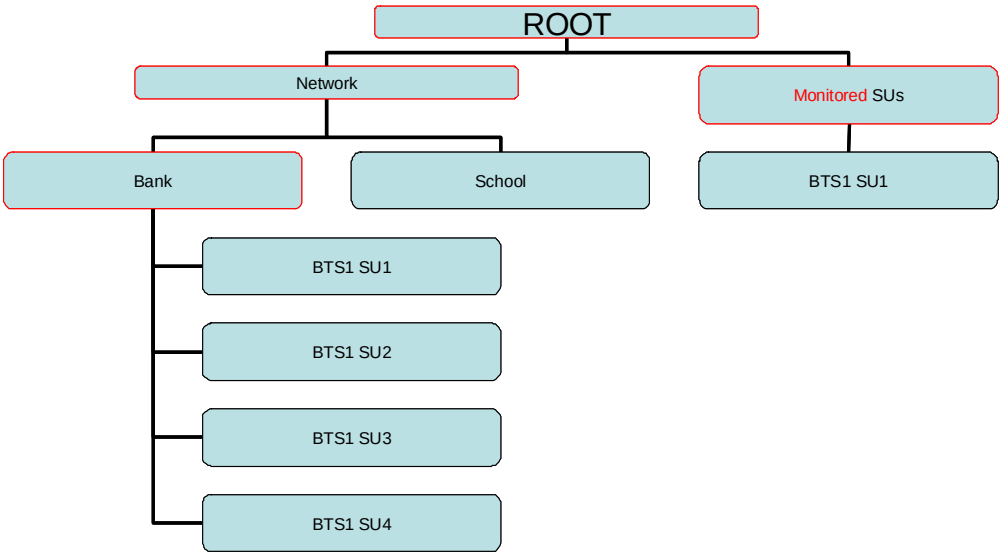


Figure 3-12: Mapping by Facilities

Chapter 4

Viewing Measurements

In this chapter:

- "Introduction" on page 50
- "Measurements Browsing Options" on page 51
- "Measurements Display Options" on page 52
- "Viewing Measurement Data" on page 54
- "Searching Measurements" on page 55
- "Saving Items as A Submenu" on page 58

4.1 Introduction

Viewing measurements is available using a configurable quick menu at the top panel for displaying and navigation. New elements can be added to it using the Settings>Customization menu.

The Browser is also available for displaying, navigation and filtering in the site-equipment-measurement hierarchy, and it shows the measurements according to the measurement type.

Only those objects (site-equipment-measurement) for which the user has permissions are accessible.

The figure below shows the Browser and the Icon view of the selected hierarchy level (Root).

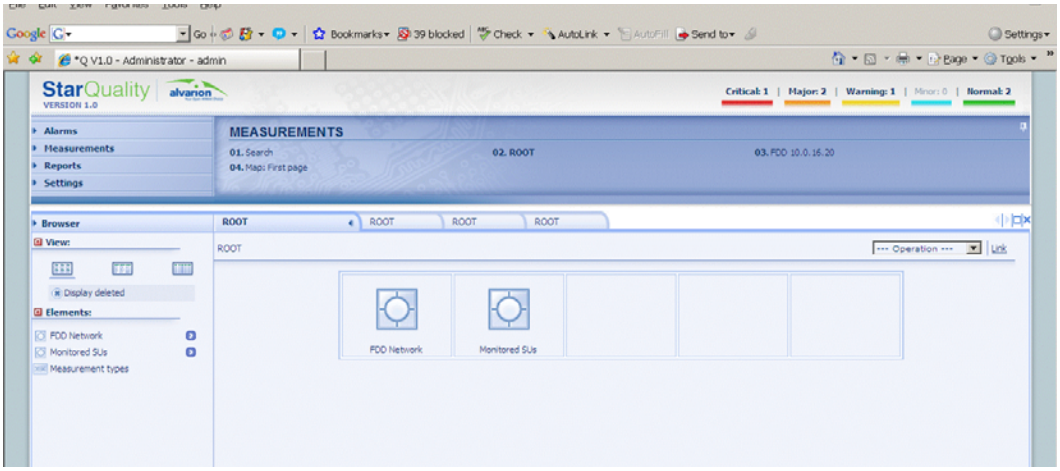


Figure 4-1: The Measurements Main Menu Item with the Browser and the Icon View

4.2 Measurements Browsing Options

You can find a specific device data using three methods:

- Navigating the path from the Measurement menu - click ROOT or FDD Network/Monitored SUs and then click the equipments icons.
- Searching for a specific equipment - see “Searching Measurements” on page 55
- Creating a specific sub-menu as a shortcut - see “Saving Items as A Submenu” on page 58

4.3 Measurements Display Options

Three display types are available in the View group:

- **Icon:** (as in Figure 4-1) the elements of the hierarchy level under the selected item are shown with a big icon and name, up to 5 items in a row. The navigation can be continued by clicking on the icons.
- **List**: the elements appear with a small icon and name, which makes it possible to view many objects on a small screen.
- **Detailed**: elements are listed under each other with a small icon, name and description. Navigation is also performed by clicking on the icon.

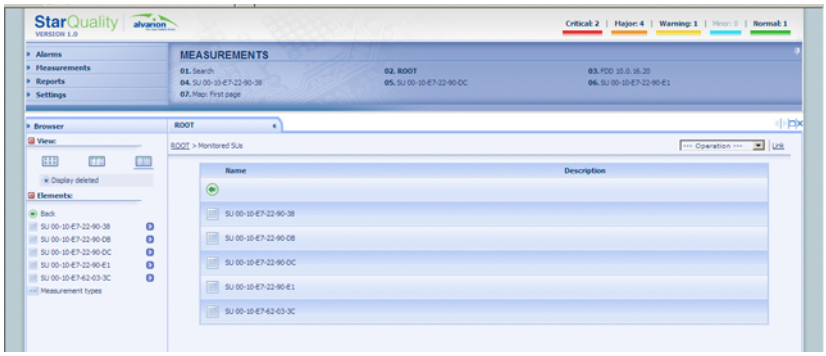


Figure 4-2: Navigation between Measurements: Detailed View

4.3.1 Element Browsing Options

The Elements group of the Browser also serves for the orderly display of the elements. The elements appear in a list, marked with a mini icon and a ► symbol.

If there are too many pieces of equipment on the current level, the Browser automatically groups them.

On the bottommost line of the Browser, you can browse all measurement types that are defined for the equipment under the current hierarchy level.

To browse elements:

Do one of the following:

- Click on the name of the object to continue the navigation on the left side.
- Click on the ► symbol to browse to the selected site or equipment; the elements under the selected equipment also appear in the currently active tab.
- In case of many equipments, click on a group to “unfold” it. The system stays at the same level, so clicking does not mean a hierarchy level changed.
- Click Measurement Types to navigate the hierarchy and display only the elements that include the selected measurement type.

4.4 Viewing Measurement Data

After reaching the equipment level using one of the navigation methods described above, the measurement results can be reviewed in chart format by selecting the concrete equipment.

Note that the elements in the main part of the display and in the **Elements** group of the **Browser** pane are not necessarily corresponding, that is, the StarQuality draws automatically only the fewest charts possible.

Also, because of minimizing the required chart drawings, the StarQuality draws only the first 20 charts, and the others are visible only when scrolling down the page.

You can set the chart display options in the View group:

- **Large Charts**: the charts appear in one column
- **Medium Charts**: the charts appear in two columns
- **Small Charts**: the charts are arranged in a three column table

A chart always uses the whole available area, namely if you hide the menu system using the expand page icon, or change the shape of the Browser window, then StarQuality redraws the chart(s) accordingly.

4.5 Searching Measurements

Search is relevant to names of sites, equipment, etc. but not to IPs.

You can use the Measurements > Search menu item for displaying actual measurements.

After searching, use the [view]link next to the equipment to view the measurement charts.

To start searching for a measurement:

Specify a searching string, using one of the following methods:

1. Simple search: type the string directly in the input field, and click OK.
2. Click Advanced Search; an advanced window is displayed, which facilitates the construction of the searching string and contains the following insert fields:
   a. **Search to parent name (Yes/No):** If rou select “yes” the search finds those objects whose parent name meets the conditions (e.g. the parent is the containing site for a piece of equipment).
   b. **Name:** name of the object to be searched. The _ and ? characters match an arbitrary single letter, while % and * match an arbitrary string. The expressions in separate lines will be in OR relation with each other.
   c. **Without:** characters to be ignored by the system (the format is the same as above)
   d. **Type:** the type of the object to be searched. Subtype can also be given for equipment, equipment template and measurement type.
   e. **Results count:** maximum number of results

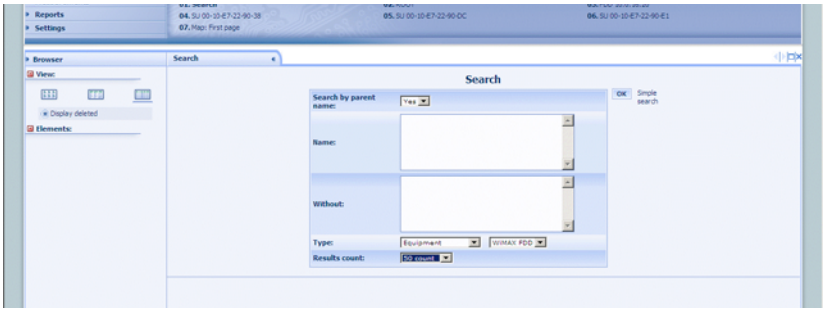


Figure 4-3: Advanced Search

3 Click OK; The results are displayed as well as the searching string as it could be given at simple search.

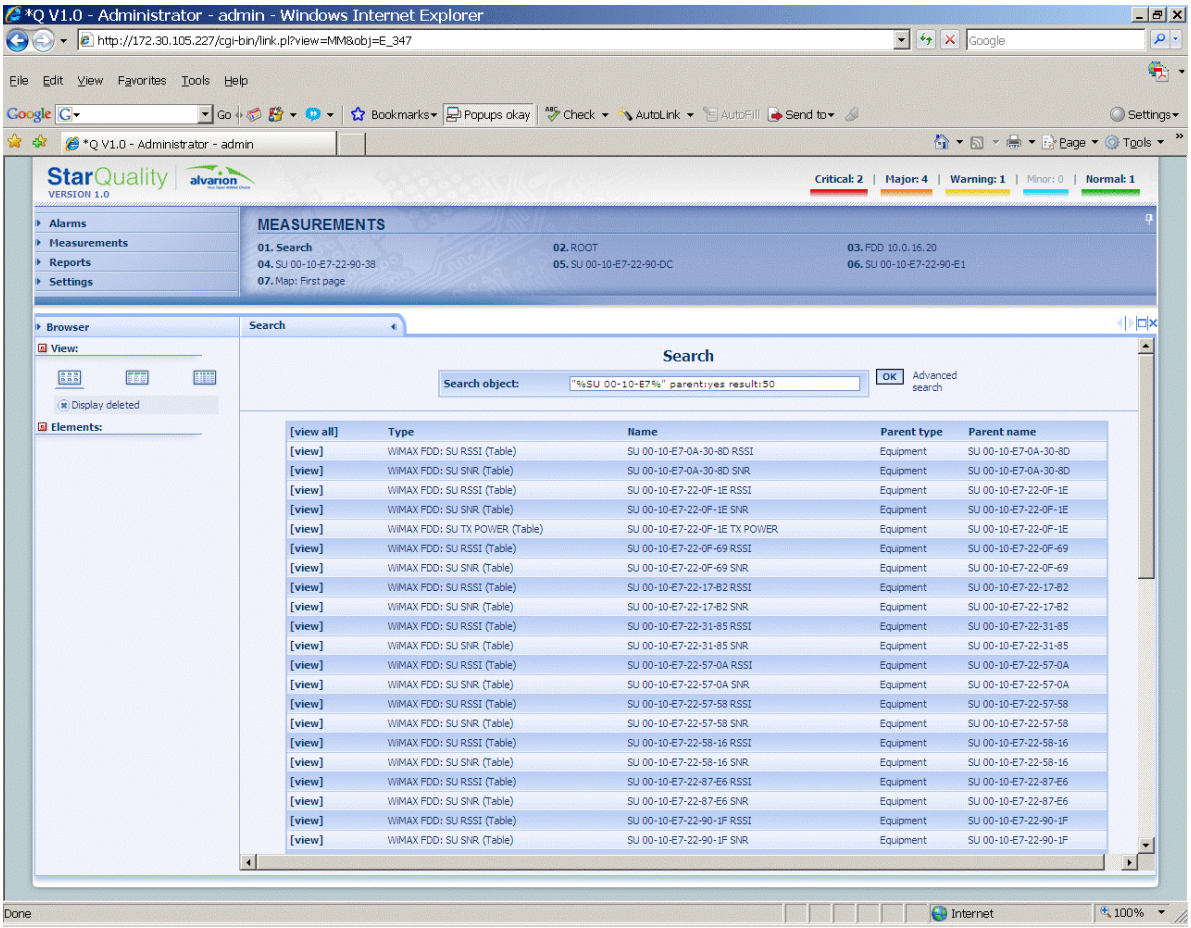


Figure 4-4: Measurements Search Results

To use the Search results in Measurements:

1. To display the the found objects click [view]).
2. If the results contain only measurements or charts, to display them together, click on the [view all] link; A page containing the charts is displayed.
3. To create a virtual equipment containing the displayed list of measurements or charts, click [Save as Virtual Equipment] .

NOTE

This method can substitute the manual selection of measurements and charts under the Customization menu item.

4.6 Saving Items as A Submenu

You can create a submenu item under the Measurements menu in order to have a shortcut to a selected item. This may save navigation time and searching for data. This feature is

See also "Customizing Public and Private Menu Items" on page 96

To create a submenu item:

1. Click the equipment icon you want to create a shortct to.
2. From the Operations drop-down menu select Save As Submenu.
3. Specify if this menu item should appear in Measurement or Alarms or both menus.
4. Click OK; the item appears in the Measurements/Alarms menu.

Chapter 5

Settings

In this chapter:

- “Search” on page 61
- “Site and Equipment Configuration” on page 62
- “Thresholds” on page 73
- “Customization” on page 93
- “Server Configuration and Management” on page 105
- “Audit Trail” on page 117
- “User Administration” on page 120

5.1 Search

Searching is relevant to names of sites, equipment, etc. but not to IPs.

Under the Settings > Search menu item you can search the stored objects in the system. This menu is only accessible to the administrator and restricted administrator users.

To start searching for an object:

Specify a searching string, using one of the following methods:

1. Simple search: type the string directly in the input field, and click OK.
2. Click Advanced Search; an advanced window is displayed, which facilitates the construction of the searching string and contains the following insert fields:
   a. **Search to parent name (Yes/No):** If rou select “yes” the search finds those objects whose parent name meets the conditions (e.g. the parent is the containing site for a piece of equipment).
   b. **Name:** name of the object to be searched. The _ and ? characters match an arbitrary single letter, while % and * match an arbitrary string. The expressions in separate lines will be in OR relation with each other.
   c. **Without:** characters to be ignored by the system (the format is the same as above)
   d. **Type:** the type of the object to be searched. Subtype can also be given for equipment, equipment template and measurement type.
   e. **Results count:** maximum number of results
3. Click OK; The results are displayed as well as the searching string as it could be given at simple search.

To use the Search results in Measurements:

1. To display the the found objects click [view]).
2. If the results contain only measurements or charts, to display them together, click on the [view all] link; A page containing the charts is displayed.

5.2 Site and Equipment Configuration

The following topics are covered in this section:

- "Object Hierarchy Overview" on page 62
- "Sites Configuration" on page 63
- "Equipment Configuration" on page 66
- "Creating and Editing Virtual Equipment" on page 70
- "Linked Equipment" on page 72

5.2.1 Object Hierarchy Overview

5.2.1.1 Non-virtual Objects

There are three non-virtual object types in the system obeying the following three rules:

- **Sites:** Each site has a name and an optional descriptive text. Each site can contain arbitrary many sites and equipments. Each site may reside below another site, and this relation can be modified during the existence of the site. The initial site (ROOT) is an exception to this rule and can only contain sites and cannot be modified or deleted. The name of the site has to be unique only inside the site containing it, although it is recommended to keep it globally unique.

- **Equipment:** Each piece of equipment belongs to a site. This relation can be modified during the existence of the equipment. The name of the equipment has to be unique in the whole system globally.

- **Measurements:** The equipments contain the measurements which cannot be moved to another piece of equipment.

5.2.1.2 Virtual Objects

In the StarQuality system the administrator and the restricted administrator users can create sites, equipments and measurements. These items are immediately available for authorized users too: they appear under for example the Measurements menu item, where the individual elements are displayed in the

same division and in the same way as the administrators have specified during creation.

This initial hierarchy and its objects are called basic or normal objects. Parallel to this structure both administrators and normal users can develop their own structures; moreover, administrators can create public structures as well. Each level of the basic hierarchy has its parallel equivalent:

- Virtual site: corresponds to a site object; can be placed under any basic or virtual site, and can contain virtual sites, virtual equipment and linked basic equipments
- Virtual equipment: corresponds to an equipment object; can be placed under any basic or virtual site, and can contain measurements and private/public charts
- Private/public charts: correspond to the measurement object; in contrast to that, however, it can contain not only one or two measurement values but also arbitrary measurements and report summaries of an arbitrary piece of equipment. It can be placed under virtual equipments manually. It can automatically appear under basic equipment too if it contains a measurement running on the given equipment or a report summary for that equipment

This parallel structure is used, according to the settings under the Preferences menu item, for the display of both measurements and thresholds filtered by site or equipment. Contrary to this, for the Reports menu item one can move along only the basic hierarchy.

Virtual sites and equipments can be private or public objects: administrator users can create both types, the admin users only the public ones, while the other users only the private ones, a restricted administrator cannot modify a public one except it was created by himself. In both cases, the configuration follows the same principles and there is only one restriction: only public virtual sites, equipments and measurements can be placed under public virtual sites, while only the private ones under private virtual sites.

5.2.2 Sites Configuration

The administration of the (basic and virtual) sites, (basic and virtual) equipments and measurements is performed under the ‘Site and equipment’ menu item (Settings > Site and equipment configuration). You can also configure threshold settings (limited to measurement thresholds on a single equipment only, otherwise use the Settings > Threshold menu item, see “Thresholds” on page 73),

and charts (of measurements from the same equipment in the hierarchy only, otherwise use the Settings > Customization > Public Charts or Private Charts menu items).

In the Site and Equipment Configurationand the Threshold and Graph Template configurations, the following elements appear at the top of the page, and stay visible even if the page is scrolled (see Figure 5-1):

- The path showing the actual location within the hierarchy. To return to a higher hierarchy level, click on the elements of the list, except the last one.

NOTE

If you navigate to an equipment through one of its virtual sites, then after any equipment modification you cannot return to that point in the virtual hierarchy, since the application modifies the current location according to the normal hierarchy, i.e. it will show the equipment under its parent site.

- A scroll down list with the following functions:
  - » Go to the Measurements or Alarms main menu item by keeping the selected hierarchy item.
  - » Configure external links and hence connect the StarQuality to any WEB based application or to a WEB page (e.g. equipment documentation).
  - » For non-virtual equipment, accessing the threshold and private or public chart template configuration pages
  - » For non-virtual equipment, accessing different equipment modification modes.

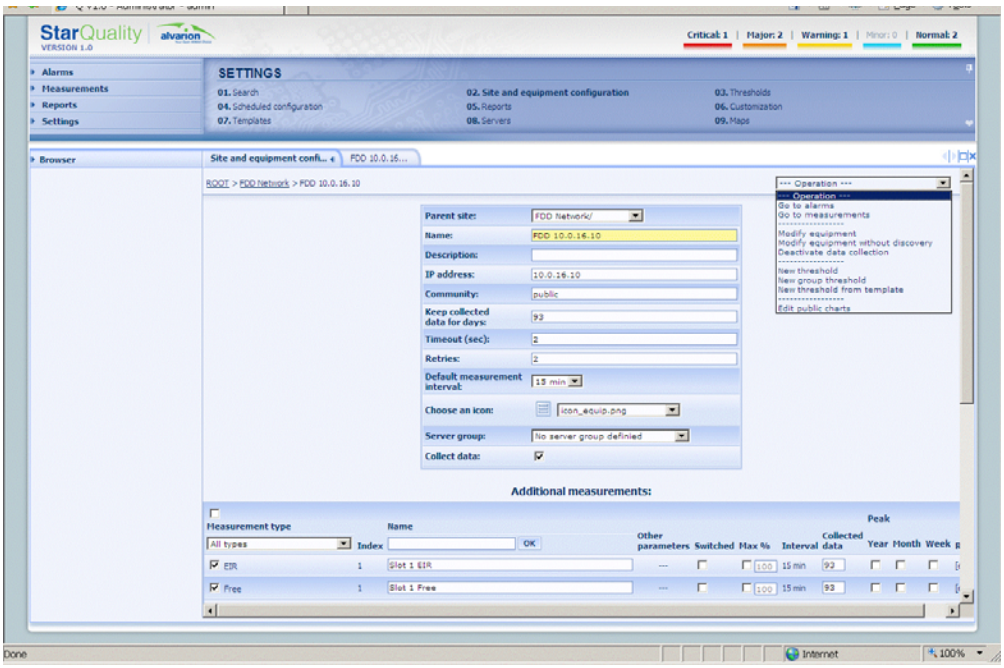


Figure 5-1: Site and Equipment Configuration Window

5.2.2.1 Adding and Editing Sites

You can create objects by selecting the kind of object from the scroll down menu in the table header under the basic or virtual site (see Figure 5-2).

To add or edit a site:

1. Select Settings > Site and Equipment Configuration.
2. Select the site that should contain the new one, then from the scroll down menu in the table header select New Site.
3. Fill in the site name, its description and choose the corresponding icon and server group (if not already specified). Click OK.
4. To modify a site, click either (`[edit]` or `[del]`) next to the site. Only empty sites can be deleted.

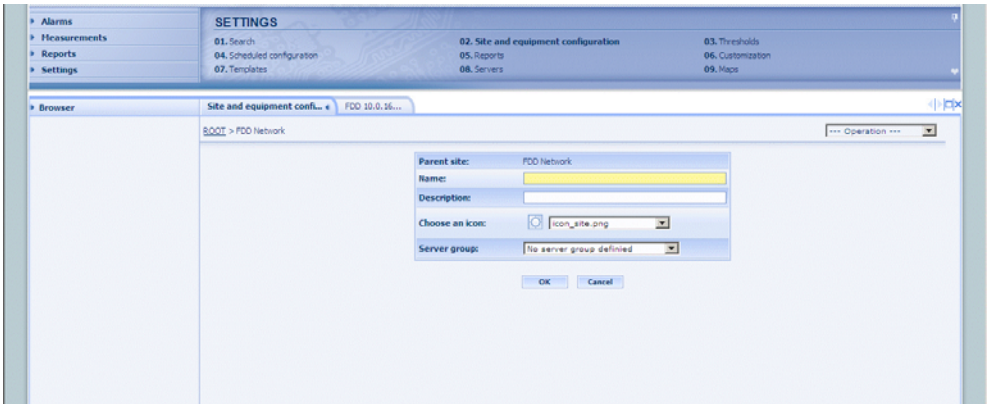


Figure 5-2: Adding a New Site

5.2.2.2 Creating and Editing Virtual Sites

The creation and editing of virtual sites is performed similarly to non-virtual sites (See above). When adding a virtual site, select the New public or New private site item from the pull down menu. The main difference is that under virtual sites, basic sites or equipment cannot be created (the latter can be only linked), therefore no server groups can be specified.

5.2.3 Equipment Configuration

5.2.3.1 Creating New Equipment from Template

The only templates available are either those not assigned to any site (general templates), or templates that are assigned to the current site (specific templates). If there is more than one available template, you choose the proper one. Then the system orders the templates so that the ones belonging to the data collector type of the current site are listed at the beginning.

In StarQuality there is only one template (WiMAX FDD) and the system selects that automatically.

5.2.3.1.1 Template Based Creation of Single Equipment

To create equipment from template:

1. Select the parent site of the equipment.
2. Select New Equipment from Template from the Creation pull down menu on the Site and Equipment Configuration page.

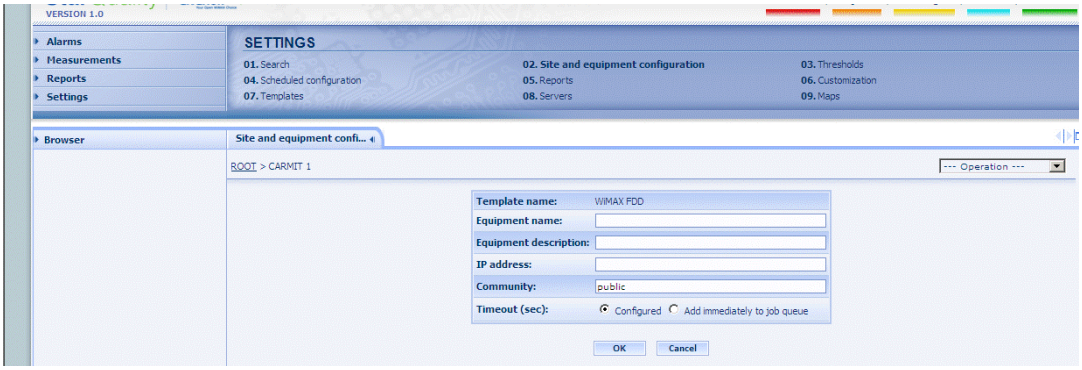


Figure 5-3: Creating New Equipment from Template

3 Fill in the required parameters.

4 Select whether the application should try to query the equipment:

» Configured: according to the values specified on the page or in the template

» Add immediately to job queue: the application does not create the equipment, but it defines it as a scheduled configuration.

5 Click OK; If you chose “Configured” the application tries to create the equipment with its measurements, thresholds etc. immediately. If the creation is successful, then the page containing the measurements of the equipment is displayed. If not, the application sends an error message and you can save the operation as a scheduled configuration.

5.2.3.1.2 Template Based Creation of Multiple Equipments

In the StarQuality it is possible to create multiple equipments from a template.

See “Discovering the Network” on page 42.

5.2.3.2 Equipment Modification

To modify a piece of equipment:

Use one of the following methods for equipment modification:

- Equipment Modification in Settings:

a Click [Edit] next to the equipment name, or click the equipment icon and select Modify Equuipment from the Operations pull down menu; the system rediscovers the list of measurements that can be carried out on the equipment. The following notice appears on the page:

Figure 5-4: Equipment Discovery Message

The following page is displayed:

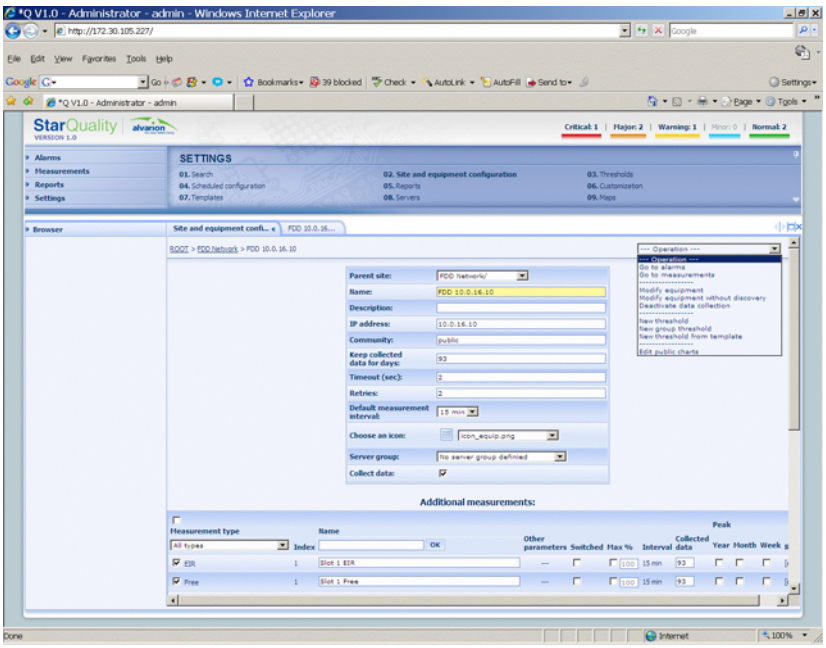


Figure 5-5: Equipment Modification Window

b Modify each parameter and click OK; The equipment configuration page is displayed.

- Equipment modification from the site:

  when viewing sites, use the [edit] link in the equipment lines, or select Modify Equipment from the Operations pull down menu to display the same page as in the previous item with the only difference that after the modification the system returns to the site page.

- Equipment modification without discovery:

  During Equipment Modification, only the equipment parameters are modified, and not measurements. Accordingly, the StarQuality does not carry out the

equipment discovery, and consequently the modifications can be performed faster, provided you modify equipment parameters only

- Activating/deactivating data collection:

  in the Operations pull down menu, either Activate or Deactivate data collection appears, depending on the equipment status. The turning on and off Data Collection operations corresponds to the setting and clearing of the “Collect data” check-box in Equipment Modification page (see Figure 5-5). After turning off the data collection, the StarQuality does not collect data from the equipment until the switch is turned back, but it does not delete the equipment either. Therefore, the equipment is displayed similarly to other equipment under the Measurements and Alarms menu items, and its threshold and charts definitions are also retained.

5.2.3.3 Viewing the Equipment Configuration

To view the equipment configuration, click on the icon of the equipment in the list; a page with similar structure is displayed, with the following differences:

- Only the active measurements are displayed, and they cannot be modified
- On this page the threshold settings related to the equipment is displayed, which can also be modified from here.

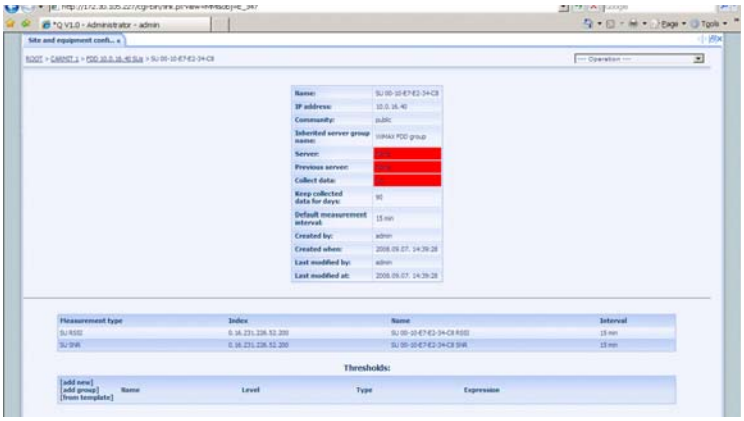


Figure 5-6: Viewing Equipment with Additional Equipment Parameters

5.2.3.4 Equipment Deletion

You can delete equipments even if measurements belong to them. The deleted equipments, measurements and measurement results will be deleted from the active tables and placed into the archive tables.

The deletion function differs from the equipment deactivation function: for the former one, the measurements can be restarted for the equipment only if they are recreated, and so the thresholds definitions and the public and private charts have to be recreated again. In equipment deactivation, however, the data collection is suspended for the equipment, but nothing is deleted.

5.2.3.5 Threshold Modification for Equipment

Use the Operations pull-down menu to modify thresholds specifically for the selected equipment.

Refer to "Thresholds" on page 73.

5.2.3.6 Editing Charts for Equipment

Use the Operations pull down menu to modify charts specifically for the selected equipment, or scroll down to the threshold menu at the bottom of the page.

Refer to "Configuring Public and Private Charts" on page 98.

5.2.4 Creating and Editing Virtual Equipment

When creating a virtual equipment, you specify only the name and an optional description. After the creation, the virtual equipment can also be modified.

A newly created virtual equipment has a single parent object (with the current site), but later it can be placed under other sites as well. Accordingly, the parent site is a pull down menu suitable for choosing more elements, where the order in which the elements are displayed depends primarily on whether they have been selected to the equipment before.

To create a new virtual equipment:

1. In *Settings* > *Site and Equipment Configuration* select the site to which to add a new virtual equipment by clicking on its icon (you can also add virtual equipment directly to the ROOT).
2. From the Creating pull-down menu select New Public/Private Virtual Equipment.
3. Specify the name and an optional description.

To modify a virtual equipment:

Use the following methods to modify:

- Basic parameters: Click [edit] next to the virtual equipment entry and modify the name and description as required. You can also modify the parent basic and virtual sites, using the parent site pull down menu.

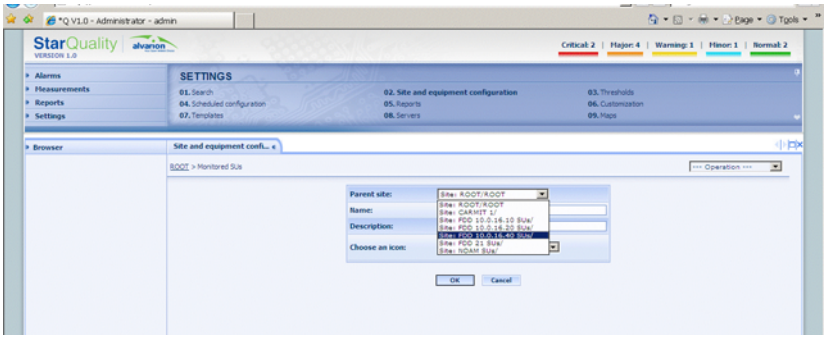


Figure 5-7: Virtual Equipment Modification I

- Assigning measurements and charts:

  a Click on the equipment icon.

  b Select either [add new] to add charts or measurements, or [del] to delete the equipment.

  c To choose a measurement to assign, specify reqired equipment parameters (see Figure 5-8).

  Use the symbols [%] and [_] to match an arbitrary substring or character, respectively. The search results are displayed in a list, where you can select parameters for the creation by setting or clearing the check-boxes in the lines, or changing the state of all check-boxes together with the check-box in the first line (see Figure 5-9).

  d To chose a chart to assign, specify its name. The searching method described above is similar for this step.

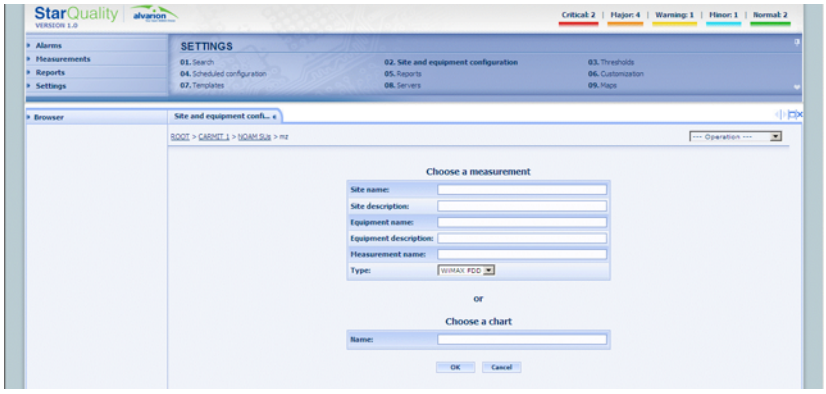


Figure 5-8: Virtual Equipment Modification II

Figure 5-9: Virtual Equipment Modification - Site Search Results

5.2.5 Linked Equipment

Under the virtual sites you cannot insert or delete equipment, but you can link the already inserted equipment or remove an existing connection.

To create a link to equipment:

1. From the Creating pull down menu select Link Equipment.
2. Specify equipment parameters to search.
3. From the search results, select the equipment to be placed under the virtual site.

5.3 Thresholds

5.3.1 Overview

Thresholds are defined in the StarQuality system in order to trigger alarms when the values ecceed the threshold. There are two main threshold types:

- **Normal** - triggers an alarm based on an expression containing one or more measurement values.

- **Grouped** - triggers an alarm depending on normal alarms rather than measurements: it will alarm when there are more alarms than the threshold limit specified in the expression on a normal or virtual site or a given device. The grouped alarms can summarize all possible types of alarms.

The defined thresholds can be complex expressions using different measurements of different devices within different sites. You can also use templates to build thresholds.

The process of adding, viewing and modifying thresholds depends on whether it is initiated from the menu (Settings > Thresholds > Configuration) or from the Equipment Configuration page. The difference between these two options is the sets of displayed thresholds and selectable objects, and the displayed measurement names.

To initiate threshold configuration:

Use one of the following:

- From the Settings menu:

  1 From Settings > Thresholds select Configuration. The list of thresholds is displayed (Figure 5-10). All normal and virtual site-device, measurements and thresholds can be selected, and the names of the measurements are displayed in the form <site name>.<equipment name>.<measurement name>.

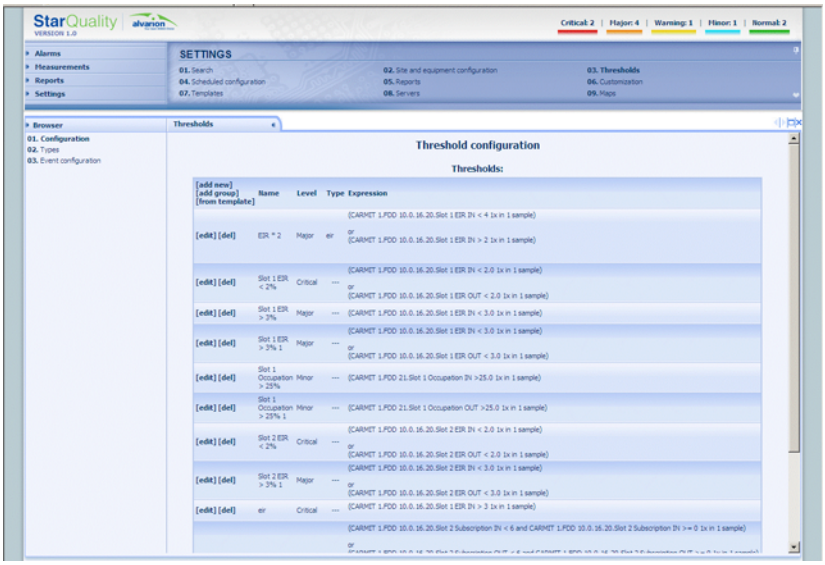


Figure 5-10: Thresholds Configuration from the Settings Menu

2 Click [edit] next to the threshold you want to modify; The Threshold Configuration window is displayed.

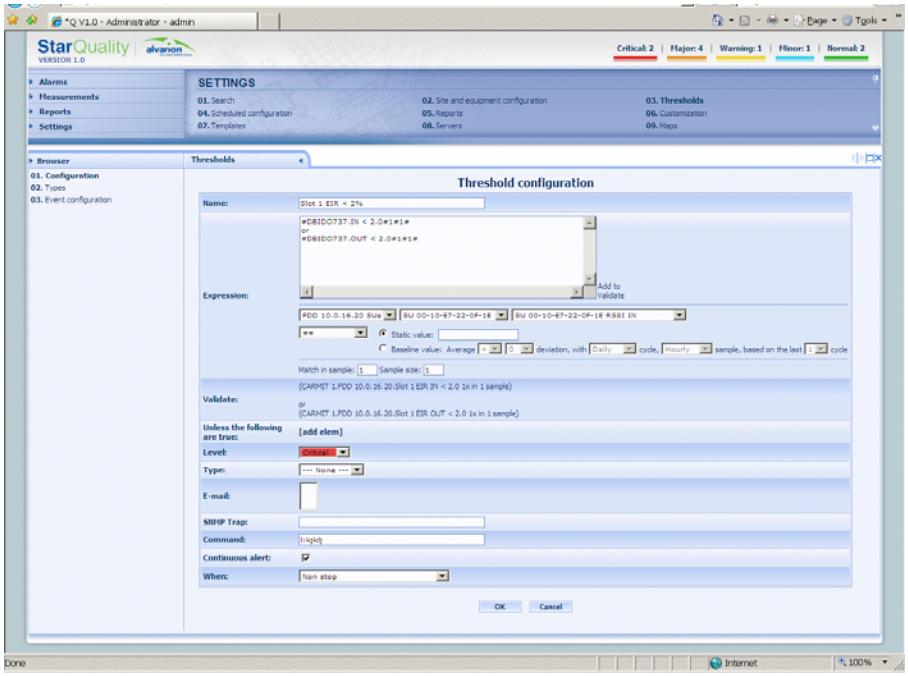


Figure 5-11: Threshold Configuration Window

3 Modify the fields as required. Refer to “Editing Thresholds Configuration” on page 76.

- From the Equipment configuration page:

1. From Settings select Site and Equipment Configuration.
2. Select an equipment by clicking on its icon; The equipment page is displayed (Figure 5-12).

   Only the measurements and thresholds belonging to the equipment can be selected. In case of group definition, only the device as an object can be provided, and the names of the measurements are not completed with the name of the site and of the equipment.

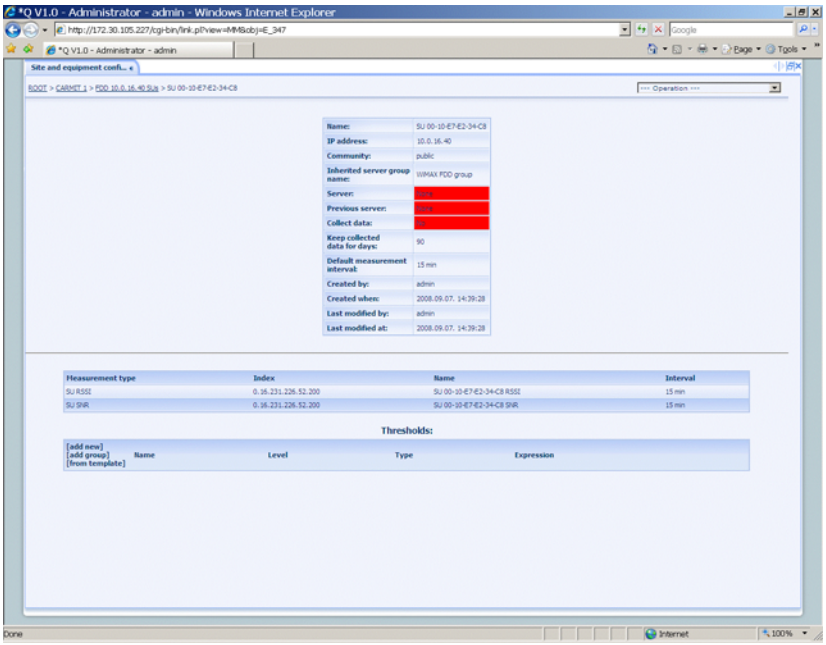


Figure 5-12: Equipment Page

3. Do one of the following:

   - To add a new threshold, click [add new]. Refer to "Editing Thresholds Configuration" on page 76
   - To add a new group of thresholds, click [add group]
   - To add a threashold based on a template, click [from template]. Refer to "Creating New Thresholds Based on Templates" on page 89.

5.3.2 Editing Threshold Types

Each threshold may belong to a type which does not need to be specified. Therefore, when a type is deleted, the thresholds belonging to that type will not be deleted but become typeless. The types have a single name parameter. Configuring a type is done separately in the system in order to allow selection of the type values from a dropdown menu when configuring or displaying the thresholds.

A restricted administrator cannot edit a type if it is used by a threshold template or by a threshold for which the user does not have right.

To edit a threshold type:

1. From Settings > Thresholds select Types; The Threshold Type Configuration page is displayed.
2. Do one of the following:
   - To add a new type, click [add new]
   - To delete a type, click [del]
   - To change the type name, click [edit] next to the threshold type and modify the name

5.3.3 Editing Thresholds Configuration

The Threshold Configuration window contains the following editable fields (see Figure 5-11):

- **First column:** The thresholds can be configured using the following links:
  - `[add_new]`: adding a new normal threshold (see "Editing Thresholds Configuration" on page 76)
  - `[from_template]`: creating a new normal threshold from a template (see "Assigning Threshold Templates to Equipments" on page 91
  - `[add_group]`: adding a new group threshold

- [edit]: modifying the threshold in the given line(see "Editing Thresholds Configuration" on page 76)
- [del]: deleting the threshold in the given line

- **Threshold name:** The name of the threshold that is sometimes displayed at the individual measurements and in the threshold violation list. This has to be unique.

- **Level:** The possible threshold values in decreasing severity levels:
  - Critical
  - Major
  - Warning
  - Minor

- **Type:** the type of the threshold; the list can be modified in the Types menu (refer to "Editing Threshold Types" on page 76)

- **Expression:** The threshold format. The application displays the expression in text format, while editing the expression is displayed in its original form in case of normal thresholds, and as different input fields for grouped alarms. Rerfer to "The Expression of Normal Thresholds" on page 79 and "The Expression of Grouped Thresholds" on page 85.

- **Add to Validate** link - using the Validate link you can check the expression in a textual format.

- **Unless the following are true**: add elements to limit the threshold.

- **E-mail:** The email addresses to which the application should send a message if there is threshold violation. Zero or more email addresses can be specified from the list of e-mail addresses provided earlier. The user (except the user with the admin name) cannot delete other user's e-mail addresses from the list. At threshold violation the system will send separate or a single e-mail message containing the violations of the same cycle generated at the same time depending on the configuration.

- **SNMP Trap:** Email address and port to where the application should send an SNMP trap if there is threshold violation. Zero or more email addresses can be

given, separated by commas. The format of the individual addresses: [community@]computer_name[:port]. If you do not set an explicit community, public is used by default. If you do not set an explicit port, it is 162 by default. The system also sends the variable causing the violation in the SNMP trap, but only if there is only one variable in the threshold definition and its current value can be stored in 32 bits.

- **Command:** What other further command should be executed in case of a threshold violation. The command is executed by StarQuality from its bin directory. The following parameters are passed to the command via the command line:
  - Threshold ID
  - Threshold name
  - Threshold level: 1=Minor, 2=Warning, 3=Major, 4=Critical, 0=Normal (cleared)
  - Time format YYYY.MM.DD. HH:MM:SS
  - Measurement data (in case of normal threshold): this appears as many times as the number of measurements that took part in the violation (this is missing when the command is executed when the alarm expires).
  - Site ID
  - Site name
  - Equipment ID
  - Equipment name
  - Measurement type
  - Measurement ID
  - Measurement name
  - IN value
  - OUT value
- **Continuous alarm:** If it is set, then at each violation the appropriate email and/or SNMP trap will be sent and/or the appropriate command is executed. If not set, the application will send an email only if there was no violation

during the previous measurement. In both cases it will send an email and/or SNMP trap and/or execute the command when the threshold violation is ended. If the value of the CLEARED_TRAP_COUNT configuration variable is larger than 1, then the system sends not only one but the given number of traps when the threshold violation ends.

- **When:** Which time period template is used for the threshold.

When thresholds are added or modified, several fields, in addition to the expression, are displayed by the application (like in the query view), but the editing of the expression is different for the normal and group thresholds.

5.3.3.1 The Expression of Normal Thresholds

In case of normal thresholds, the editing of expression consists of two parts:

- A multi-lined condition expression that determines when the expression is true, thus when the system should send an alarm.

- An optional list of exception thresholds which, when all are satisfied, the alarm should not be generated. This serves as “masking” of the edited threshold.

For example, if three thresholds, A, B and C and at the A threshold, the B and C thresholds are set as exceptions (“parent”), then even if the expression set at A is true, the alarm will not be generated if the expression at B and C are both true. If in this example B and C are the examination of the availability of a router and A is an evaluation of a device which can be reached by B or C router, then no kind of false alarm will be generated for the device A when neither router is available.

In a normal threshold expression you can use condition systems based on static values or on dynamic values. These two types can even be mixed in a single expression.

For the static condition the measurement value is always compared to the same value. For example, the value of a traffic measurement is always higher than 10 Mbps (10000000). The advantage of this condition is that it is easy to define; its disadvantage is, however, that it does not take into account the long-term changes in the measurement value, and therefore the static values must be overwritten manually at times.

For a dynamic value, however, the system takes the values of the past periods according to the specified conditions, calculates the average and the standard deviation from these values, and compares the actual measurement value to the average + or – the standard deviation value. The advantage of this method is that

if the measurement value is slowly but continuously rising (e.g., it is increasing from week to week or month to month) it is not necessary to overwrite the static value used for comparison with the average value since that is going to increase too. The disadvantage of the method is that it can be successfully used only if the measured values do not fluctuate much but they show some statistical pattern. For example, the traffic on one computer used by a single person does not meet this condition, however the common traffic of many users or the traffic of a continuously running application could. The frequency and the resolution of calculating this dynamic value can be specified as follows:

- Cycle: If the specified cycle is daily, the average and deviation value is calculated based on the last X days. In this case the system does not take into account the day of the week. So, for example, the basis of the measurement on Monday is the average and standard deviation values on the previous Sunday. If the cycle is weekly, then the basis for the measurement is on Mondays, the values measured on Mondays of the last X weeks, on Tuesdays the values on Tuesdays of the last X weeks, etc.

- Resolution: if the resolution is hourly, then at 3:30 p.m. the system takes the measured values between 3 p.m. and 4 p.m. on the days defined by the above cycle specification. If the resolution is four-hours, then the data measured between 12 p.m. and 4 p.m. are considered, and if it is daily then the data of all days corresponding to the Cycle conditions are used.

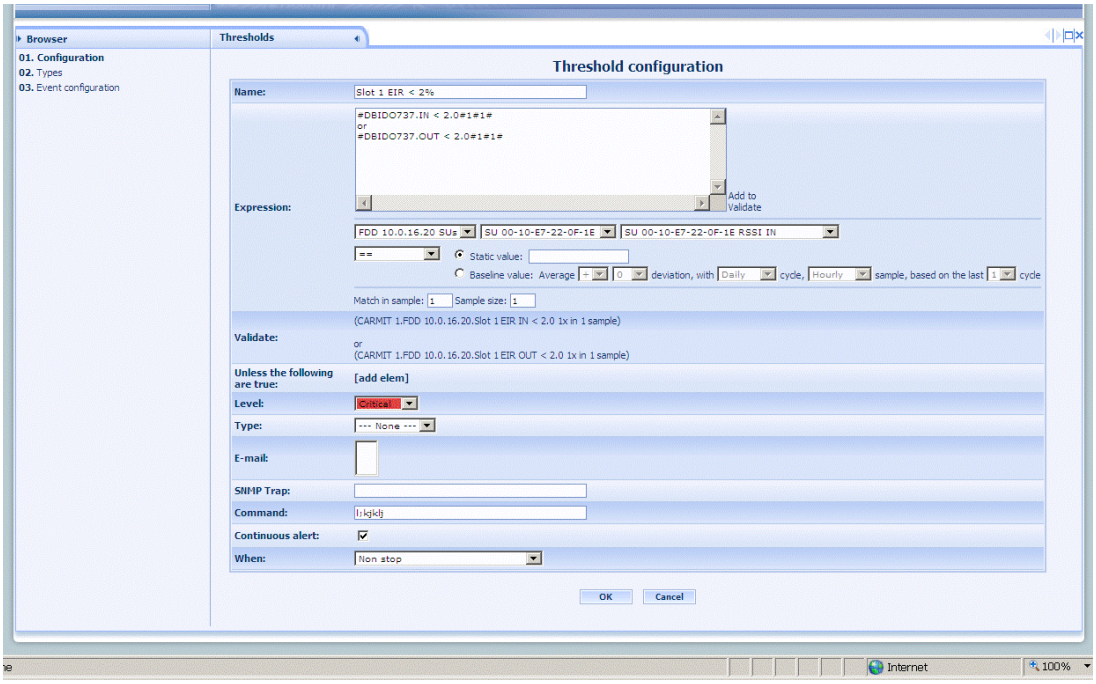


Figure 5-13: Normal Threshold Configuration

5.3.3.2 Normal Thresholds Expression Syntax

Adding or modifying the multi-line expression is done using a complex entry structure. You can always view the current expression in the multi-line text field. You can edit the text field arbitrarily, and its content is saved at the threshold.

The structure of the expression is describedherein. However, in the majority of cases knowing the syntax of the expression is not mandatory since the conditions can be simply formulated using the available fields and the [Add to Validate] link under the editing field in the Threshold Configuration page (refer to “Generating the Expression Using Input Fields ” on page 82). Using the Validate link you can always check the expression in a textual format that is easy to understand thus does not require the knowledge of the expression syntax itself.

The syntax of the expression is based on the syntax of the Perl language with some special elements. Each of these elements comprises three parts, separated by the # character, which is also used at the beginning and end of the expression. The three parts according to their order:

- **The sub-expression to be evaluated:** An expression providing an arbitrary logical value (0 or 1). It can contain two kinds of specific elements:
  - A DBID[F or H or C or O][number][.IN or .OUT or is missing] formatted string which is substituted with the measurement value of the referenced measurement, or with –1, if there was no measured value.
  - In case of a baseline threshold evaluation, the values to be examined during the evaluation are specified by a string, with the following elements:
    - DAILY[number]CYCLE_ or WEEKLY[number]CYCLE_: the value used for the evaluation is based on the specified number of days or weeks
    - HOURLY, 4HOURLY, DAILY: the value is calculated using a hourly, four-hourly or daily resolution
    - SAMPLE_AVG[+ or -][number]DEV: the value is the average value during the specified interval described by the previous parameters + or – the specified multiple of the standard deviation
- **Frequency:** The number of times the sub-expression should return the value true in one sub-expression interval.
- **In how many samples:** The number of samples the sub-expression interval consist of.

An expression belonging to a threshold can contain several sub-expressions like this, in arbitrary relations, only nesting is not allowed. The threshold is violated when the result of the evaluated expression is true, namely 1.

5.3.3.3 Generating the Expression Using Input Fields

You can use the other input fields on the threshold creation page for generating the above sub-expression elements and selecting the appropriate measurement identifier.

To generate a threshold expression:

1 Fill in or select the following fields as required (see also “Example of generating a threshold expression:” on page 84:
   - The site and equipment of the measurement. These dropdown fields are displayed only when opening the threshold editor from the main page. If

you edit the thresholds from the Equipment page, you can choose the measurements belonging only to that specific one.

- The measurement to be selected
- Operator
- Compare value:
  - Static value: interpreted with the same measurement unit as the one displayed on the measurement chart. If there is a single measurement in the sub-expression, the application draws a horizontal line on the measurement chart at the compare value.
  - Dynamic value: the average of the measured values calculated with the specified cycle and resolution + or – a multiple of the standard deviation
- Frequency
- In how many samples

2 Click the [Add to] link; The application inserts the required element at the current cursor position in the text, which can be of one of the following two types depending on the values of the fields:

- If the compare value is filled, the application inserts a complete sub-expression element, namely:

```
#selected_measurement_code operator compare_value#frequency#in how many#
```

- If the compare value is not filled, the application inserts only the code of the selected measurement.

3 Anytime during the editing process you can click on the [Validate link] to check whether the expression has the required syntax. If the syntax is invalid, an error message is displayed, and if it is valid, the user readable format of the expression is displayed in the validate field.

Usually only the following part of the Perl syntax is necessary:

- and: and expression
- or: or expression
- +, -, *, /: mathematical operations

- (,): punctuation
- !: logical negation
- <, <=, ==, >=, >: value comparators

Following is a list of syntax elements:

Thresholds:

- » IN - downlink
- » OUT - uplink

Table 5-1: Threshold Syntax elements

Measurement Type	Value e.g: #VAR1.O#WMP.IN
EIR	WEIR IN or OUT
Free	WFRE IN or OUT
Occupation	WOCC IN or OUT
Subscription	Subscription IN or OUT
RSSI	WSU2
SNR	WSU1
Total available MIR capacity	predicted alloactable MIR
Total Free capacity	WFC
Total provisioned CIR	CIR Allocated
Total provisioned MIR	MIR+CIR Allocated

Example of generating a threshold expression:

Threshold to generate: The EIR uplink or downlink rate was higher than 10% at least twice in the last hour.

1 Choose the interface (see "To initiate threshold configuration:" on page 73) and fill in the fields as shown:

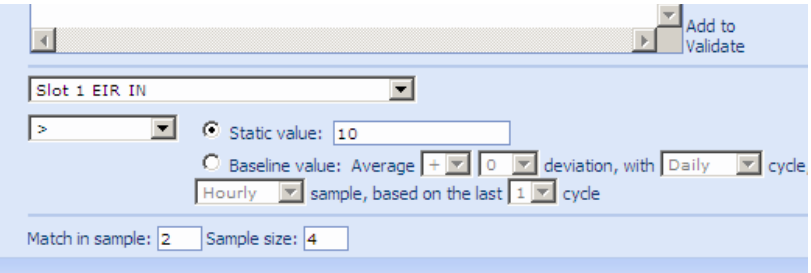

Add to
Validate
Slot 1 EIR IN
>
Static value: 10
Baseline value: Average + 0 deviation, with Daily cycle
Hourly sample, based on the last 1 cycle
Match in sample: 2 Sample size: 4

Figure 5-14: Threshold Configuration

2 Click on the “Add to” link; The text of the expression changes to:

```
#DBIDO87.IN > 10#2#4#
```

3 Type “or” at the end of the expression.

4 Choose the interface, the OUT measurement of the interface and fill in the fields as shown above.

5 Click on the “Add to” link; The text of the expression changes to:

```
#DBIDO87.IN > 10#2#4# or
#DBIDO87.OUT > 10#2#4#
```

5.3.3.4 The Expression of Grouped Thresholds

The editing of grouped thresholds is done on a different interface, thus unlike the editing of normal threshold expressions, special syntax is unnecessary.

Figure 5-15: Editing of Grouped Thresholds

Description of fields:

- **Filter** parameters: under the specified object there may be more than one alarm, which can be filtered by the following parameters:
  - Interval: 15 minutes.
  - Name: the % and _ characters can be used.
  - Level
  - Type
- Examination of **Existing Alarms**: The grouped alarm can be fired under two conditions: based on the number of all alarms or the number of the new alarms only. In the former case the grouped alarm occurs when there are more

alarms for the thresholds belonging to the group than the given limit. The alarm is stopped when the number of alarms goes below this limit. In the case of newly created alarms, the alarm is triggered when there are more newly generated alarms than the limit, and it stops when the number of the alarms falls below this limit.

- **Alarm Count** (number of alarms): In both cases the user may chose a numerical or a percent value. In the later case 100% means all thresholds belonging to the given group.

5.3.4 Creating Threshold Templates

Creating thresholds using a template enables the creation of more thresholds, even for the same measurement. First you create the template and then you configure the threshold in a specific equipment or a group of equipments to use that template.

The editing of threshold templates is in many aspects similar to that of local thresholds, for example they contain similar fields, such as E-mail and SNMP Trap, etc.

To create a threshold template

1 From Settings select Templates > Threshold Templates; The Threshold Template Configuration list is displayed.

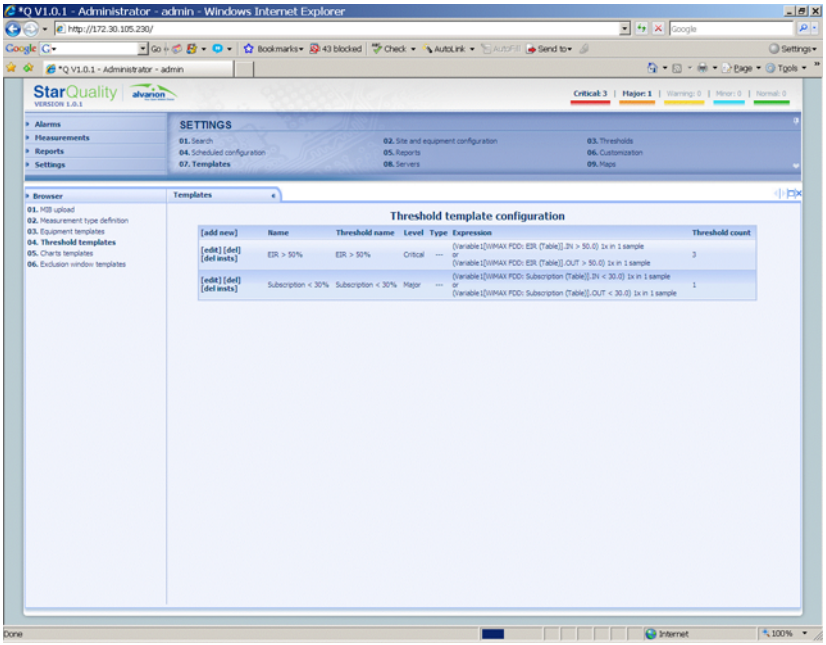


Figure 5-16: Threshold Template Configuration - Template List

2 Click [Edit] next to the threshold template to modify; The Threshold Configuration editor displays the attributes (type, e-mail, etc.) stored in the template and the expression defined in the template.

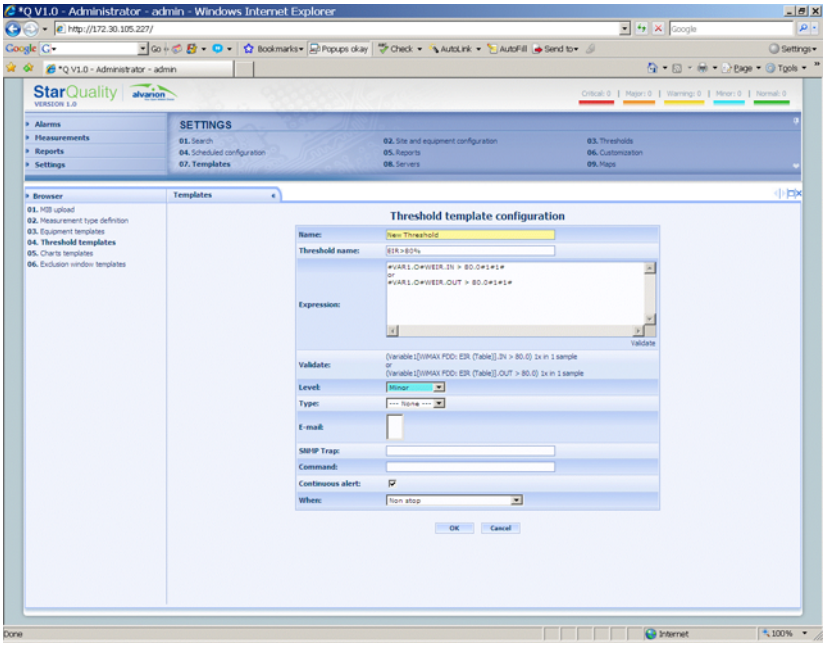


Figure 5-17: Threshold Template Configuration - Editing

3 Specify the threshold attributes (see detailed information in "Editing Thresholds Configuration" on page 76). For the **Expression** - the threshold syntax contains 4 parts, separated by a [#] key. That is: <value(VARx)> <comparators (=><)> <reference value> <frequency>. You can also have relations between expressions: Or/ And,

Example:
Name: Subscription downlink>100%

```
Syntax: #VAR1.O#WMP.IN > 100.0#1#1#
```

Meaning: Variable value 1.0, WMP (subscription) measurement downlink, should be greater than 100%, at least once per one measurement.

4 Click Validate . If the syntax is red, fix it according to the above.

5 Click OK; A new threshold is added to the system.

5.3.5 Creating New Thresholds Based on Templates

When inserting thresholds based on a template, it is not possible to edit the expression manually. Instead, the concrete expression of the threshold to be created can be defined by filling out the fields in the Variables row. The expression may contain several variables, which are named Variable1, Variable2, etc. and are identified with their sequence number in the Variables row. The expression can also contain input values (INPUT1, INPUT2, etc.), which you have to specify before the threshold is created.

Unlike the Equipment and Chart templates, the system remembers if a threshold was created from a template, and also that if during the creation process only the INPUT fields were different. The system uses this information later in different ways:

- In case of modification of these kinds of thresholds, it warns the user that a possible template modification later can overwrite the adjusted values.
- The expression in these thresholds cannot be modified together using the template, but they can be deleted in batch, and in fact when deleting the template the system automatically offers this.

To create a new threshold based on a template:

1 Select the threshold template. The Threshold Configuration editor displays the attributes (type, e-mail, …) stored in the template and the expression defined in the template.

The figure above may vary depending on certain fields of the template and the starting page (editing started from the menu or equipment page) as follows:

- If threshold creation was started from the Equipment Configuration, the Equipment name filter does not appear.
- If more variables exist in the expression, they appear in separate rows within the Variables row.
- If one variable has many INPUT fields, the additional input fields appear in the Variables row. However, if no INPUT field belongs to a certain variable, then no input field appears.
- If the threshold level was defined in the template (Critical, Major, …) or no variable has an INPUT field, then no extra INPUT field is displayed for the individual threshold level, and a threshold level pull-down list is displayed instead

2 Edit the values given in the template. The usage of the input fields in the Variables row depends on whether it is a filter or an INPUT field:

- Filter field: allows you to filter for the name of the equipment and measurement; here the symbols _ and % can be used (see "On Searching in General" on page 33). Based on the filter expression the application filters the possible list of measurements and offers thresholds to be created for the results. An important rule is that if a template has more than one variable, the system will show the thresholds only if there is a single variable to which the system finds more than one measurement. For example, in the case above, if the system finds several traffic measurements, and only one round trip time measurement, then it shows the thresholds to be created. However, if it finds several round trip time measurements too, it prompts the user to further narrow down the number of possible measurements using the filter options.
- INPUT field: according to the measurement unit of the variable, a numerical value or (-1) must be entered here and this value is substituted

in the concrete threshold (minus 1 means that the measurement was unsuccessful). If the threshold level is defined in the template, every INPUT value must be filled in for successful creation. However, if the threshold level is not defined there, only those thresholds with all INPUTS given are created. Therefore, for at least one INPUT all values must be defined for successful creation.

3 Click OK to view the list of thresholds to be created.

4 Before the actual creation you can modify this list by selecting the ones that should be created and unselecting the others.

5 Click OK; The system creates the selected thresholds.

5.3.6 Assigning Threshold Templates to Equipments

To assign a thrteshold from template to equipment:

1 Access the Site and Equipment Configuration in one of the following methods:

- From Measurements, select the equipmet and from the Operations pulldown menu select Go To Configuration.
- From Settings select Site and Equipment Configuration.

2 Scroll down to the Threshold section and click [From Template], or choose New Threshold from Template from the operations drop down menu.

3 Select a template from the list to assign to the threshold and click OK; the system displays the threshold template details. You can modify the attributes as described in “Editing Thresholds Configuration” on page 76.

4 Click OK; The threshold is added to the list of thresholds for the equipment.

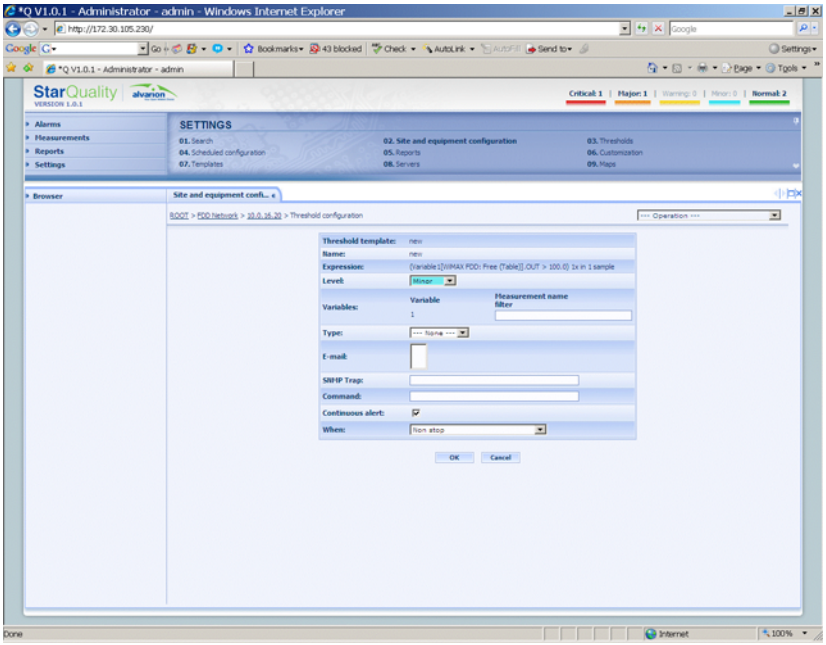


Figure 5-18: Threshold Template Details

5 Select the AUs to assign the threshold to and click OK.

5.4 Customization

In this menu item (Settings > Customization) you can make user-specific settings (non-administrator users) and system level settings (admin users).

The following topics are covered in this section:

- "Customizing Display Preferences" on page 93
- "Customizing Public and Private Menu Items" on page 96
- "Configuring Public and Private Charts" on page 98
- "Setting E-mail Addresses" on page 104

5.4.1 Customizing Display Preferences

NOTE

This section is applicable to Non-administrator users only

You can select and modify the display preferences per your needs.

To customize display preferences:

1. From the main menu select Settings.
2. From the Settings panel select Customization > Preferences. The submenu has a single page only.

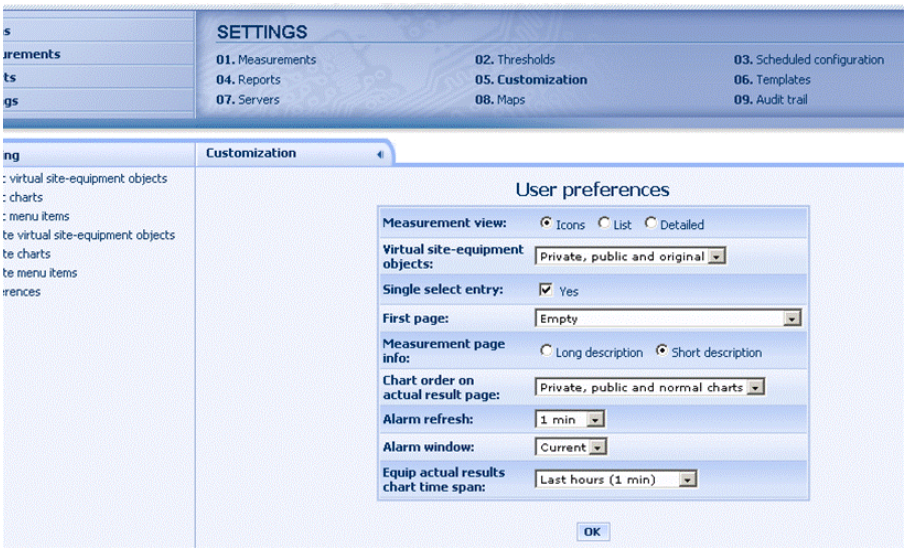


Figure 5-19: User Preferences

3 Modify the preferences as required:

- **Measurement view:** select the default view for the site and equipment configurations. For every page the view can be changed temporarily with the small icons located at the top of the page.

  - **Icons:** Large icons representing the sites and equipment, up to five in a row.
  - **List:** Small icons representing the sites and equipment, up to five in a row.
  - **Detailed:** a single element per row with the following columns:
    - **First column:** The element icon, this differentiates the equipment from the sites
    - **Name:** The name of the element
    - **Description:** The description of the element
    - **Equipment data:** Used only for equipment, contains all measurement server specific data of the equipment (e.g. community for SNMP).

- **Virtual site-equipment hierarchy:** This controls whether the private and public virtual, or the default hierarchy should be displayed below the Measurements > Current measurements submenu. The possible settings are:
  - Private and original
  - Public and original
  - Private, public and original (default)
  - Only private
  - Only public
  - Private and public
- **Single select entry:** If this option is set, then:
  - Under the “Equipment Search” menu item, the equipment will be immediately displayed if the search has a single result only
  - Below the “Current measurements” menu item the page for a given piece of equipment will be displayed immediately if the user has the rights for a single piece of equipment only, furthermore the elements of a site will also be displayed if only a single site could be accessed.
- **Starting page:** Choose the value from the scroll down list:
  - **Empty:** the initial page is displayed for the user after login
  - **Menu items:** the page below the given menu item is displayed for the user after login, its value can be one of the menu items below Alarms and Measurements
- **Measurement page info:** The amount of equipment information displayed on the page containing the measurements.
- **Chart order on actual result page:** Whether the public and/or private charts should be displayed on the base measurement page accessed through the Current measurements menu item. Moreover, if they are displayed, then in what order (this setting does not influence the display of virtual equipment, there only created charts are displayed in the order they were configured)

- **Equipment actual results chart time span:** On the equipment measurement page the chart resolution cannot be specified, instead the user can set the value here. By default this is the suggested 5-minute resolution daily chart. The smallest chart on the page displaying the details of individual measurements is set based on the time interval of the measurement, but in case of public and private charts the value given here is used.

4 Click OK; The modifications is saved and the page is refreshed with the modified data.

5.4.2 Customizing Public and Private Menu Items

You can create shortcut menu items under the Alarms and Measurements main menus.

To edit a menu item:

1 From the Settings > Customization select Public/Private Menu Items; The Menu Item Configuration page is displayed.

NOTE

The menu item configuration can also be performed from the Alarms and Measurements main menu items: after selecting the object, select the Save as Submenu action the Operation pull down menu on the right-hand side (see also "Saving Items as A Submenu" on page 58.

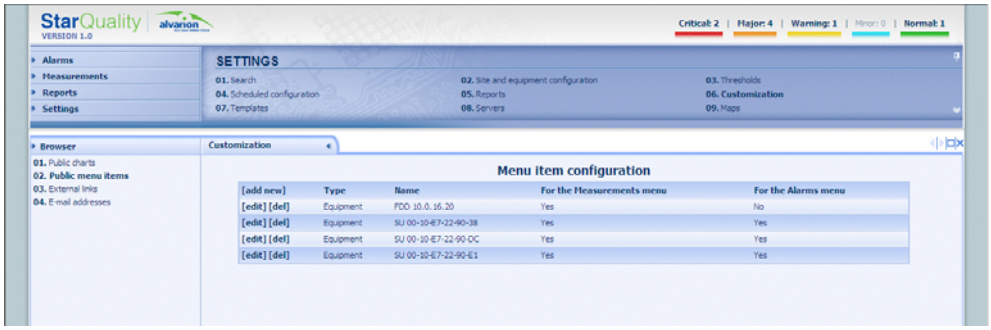


Figure 5-20: Menu Item Configuration

2 Click [edit]; The following page is displayed:

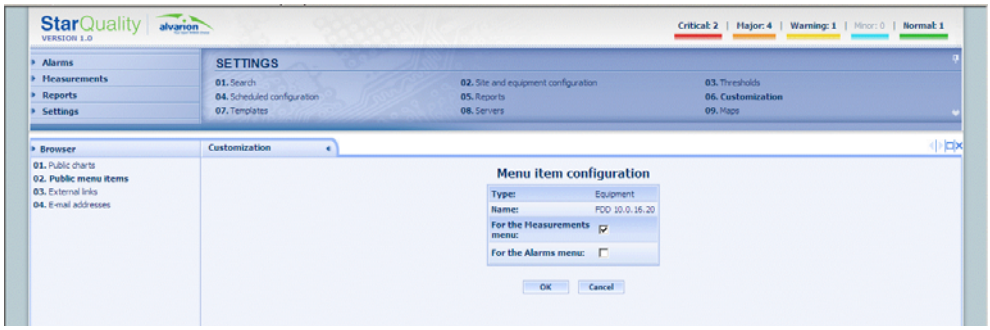


Figure 5-21: Menu Item Editing

3 Set the menu in which the edited menu item will be displayed. For charts, only the “for the Measurements menu” option can be selected.

4 Click OK; The Alarms or Measurement pages wil be updated according to your selections.

To add a new menu item:

1 Select a schematic map (created by the administrators).

2 Select the virtual or real site or equipment to which the menu item points.

3 In Settings > Customization select Public/Private Menu Item; the Menu Item Configuration window is displayed (see Figure 5-20).

4 Click [add new]; A search window appears where a search string has to be specified (the % and _ characters can be used, * and ? characters are no applicable) to obtain the list of matching elements.

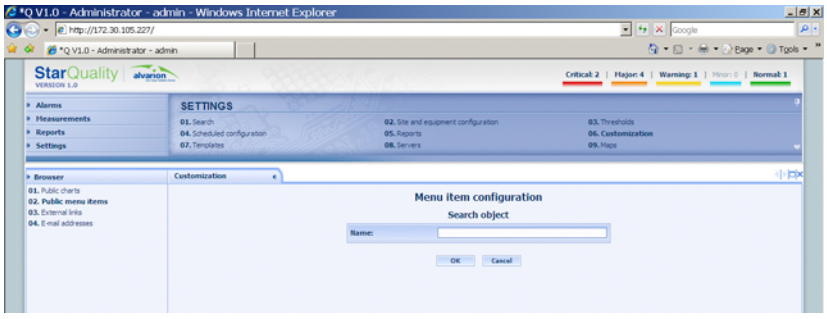


Figure 5-22: Menu Item Configuration - Search Object

5 Select the item to add to the Alarms or Measurement submenus and Click OK.

5.4.3 Configuring Public and Private Charts

Administrators and restricted administrators can edit private and public charts, while admin users can edit only public charts, and every other user - only private charts. The editing of both types takes place on pages structured almost identically; therefore, both are discussed herein, while indicating the differences between them.

5.4.3.1 Editing and Creating Charts

When modifying already existing elements in the chart, the same fields are displayed with the only difference that the name of the previously selected object in the object field cannot be changed.

To initiate chart editing:

1 Access the Chart Configuration page (Figure 5-23) using one of the following methods:

- Select Settings > Customization > Public charts or Private charts submenu items.
- Select Settings > Site and Equipment Configuration (when a non-virtual site or equipment is selected in the hierarchy). This case differs from a menu based direct access in the following points:
  - It is not necessary to specify the site and equipment name filter conditions when creating a new chart because the results are filtered automatically for the object at which the user started editing the chart.
  - There is a [back] link on the starting page, which leads back to the appropriate site or equipment.
  - Similarly to the Site and equipment configuration, both the location in the site equipment hierarchy as well as a pull down menu with the usual operations appear on the top of the page.
  - If the chart template configuration is opened from the equipment page, then for the template based creation of new charts the system automatically offers the names of the equipment and template together for chart name. However in the other case only the template name will

be offered, which in general will not be unique in the system without modification (see below)

- If the chart template configuration is opened from the equipment page, it is possible to use all chart templates at the same time, which means that you can create all charts for the equipment templates in one step.

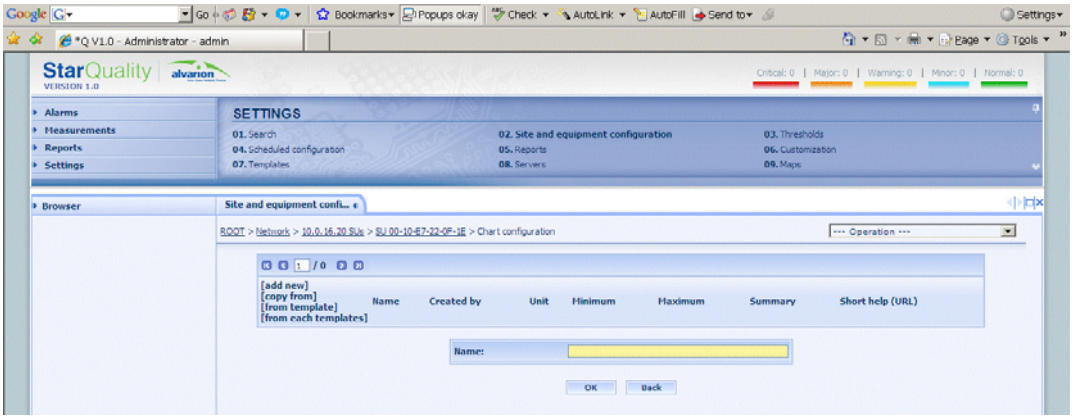


Figure 5-23: Chart Configuration (accessed from the Equipment page)

To modify chart elements:

1 Edit the information in the charts page as required. The page contains the list of private or public charts together with the following attributes:

- Editing links:
  - `[add new]`: creates a new chart
  - `[copy from]`: creates a chart based on an existing one. Both in the private and the public charts, you can choose from the list of your private charts and the public charts that you have access to.
  - `[from template]`: creates a new chart based on a template (see “Viewing Charts ” on page 104)
  - `[from each templates]`: creating new charts from templates appears only if the chart creation is initiated from the equipment page. This list allows connecting of each chart to an existing template.

- [edit]: edits the chart attributes that are displayed here
- [del]: deletes chart
- [members]: edits the members of the chart

- **Name:** The name of the chart. For public charts, it should be unique among the public charts, and for private charts it should be unique among the public and private charts. Accordingly, a public chart can be created with a name that already exists under the private charts of the user, or the same chart name can appear in the set of private charts belonging to many different users
- **Created by:** The name of the chart designer, naturally it is used for public charts only
- **Unit:** Description of the value axis of the chart
- **Minimum:** The chart minimum as a percentage or a concrete value. If it is not set, the minimum value is at 0. A percentage value is interpreted with respect to the average of the values displayed on the current chart
- **Maximum:** The chart maximum as a percentage or a concrete value. If it is not set, the maximum value is the current maximum value displayed in the chart. A percentage value is interpreted with respect to the average of the values displayed on the current chart
- **Summary:** determines if aggregate measurement values should be calculated in the table that corresponds to the chart. It can be turned on only if the chart has no element for which the Zero value (see below) is set to the previous zero value. Moreover, if it is turned on and such an element is created during chart modification or creation, it is turned off automatically.
- **Short description (URL):** This field is displayed only for administrator users. In this field a URL can be specified. If it is set, for each chart a Help sign appears for the users when the chart is viewed, and when clicking this link, the page pointed by the given URL is displayed in a new window.

NOTE

The editing and creating of these pages are not part of the StarQuality system

2 If you have administrator and restricted administrator user permissions, in addition to the above fields, you can change whether the chart is public or private.

3 Under the `[members]` link is the list of chart elements of the current chart. The items of this table are the following in order:

- Editing links:
  - `[add new]`: creating a new element
  - `[edit]`: modifying an element
  - `[del]`: deleting an element
- **Order:** The order of the element within the chart. The order not only determines the drawing order of the elements on the chart but it also influences the reference point of the chart base. The order can be modified on this starting page with the green down and up arrows.
- **Name:** The name of the element, which appears in the table of values on the chart
- **Object:** The object for which the element contain data. For chart elements the object can be a basic site or basic equipment report. For measurement chart elements it can be an interface or other measurement.
- **Threshold or report variable:** Depending on the type of the element (report or measurement) it contains the name of the threshold violation or the report variable to be displayed
- **Field:** Which measured value belonging to the object, and optionally to the report variable, should be displayed by the chart element:
  - For measurement chart elements this can be an uplink or downlink.
  - For report charts this can be minimum, maximum, average, etc.
- **Type:** The representation of a chart element should be a line, an area or a bar
- **Chart base:** Selects the chart base of the chart element. With the exception of the first element (where naturally the 0 value necessarily corresponds to the zero) it is possible to choose, whether the chart base of the chart element

should agree with the current chart base of the previous chart element (chart elements “drawn onto each other”) or with the current value of the previous chart element (chart elements “drawn over each other”). The following example shows the two different diagrams for the same value pair.

- **Color:** Element color

- **Peak color:** If the chart resolution (e.g. 15 minutes, 2 hours, etc.) is smaller than the value resolution (e.g. 15 minutes, 3 minutes, etc.), the application shows the calculated average on the chart (both on the chart defined here and on the default one). If a color is set here, the average values are displayed in addition to the maximum values of the data.

- **Transparent:** Determines whether the other possible chart elements behind the element should be visible. Its use is recommended if the type of the element is area or bar, and the value of the zero point parameters is not “previous value” but “previous zero”

- **Assume zero when value is missing:** If there is no measurement value at a given time, the application can draw the chart according to the last value, or assume the missing value to be zero.

To create a new element:

1. Select the type of the measurement or the report variable; The following configurable elements appear from the list mentioned above: name, object, and threshold (if a measurement is selected currently, see below), field, type, chart base, color, peak color, and zero value.
2. Edit the elements as required. Note that the order does not appear since the new element receives the last sequence number automatically. Depending on the object, maximum three pull down menus are displayed:
   - In case of site level report variable: site pull down menu
   - In case of equipment level report variable: site and equipment pull down menus
   - In case of measurement element: site, equipment and measurement pull down menus

The equipment pull down menu always displays the list of equipment directly under the currently chosen element in the site menu, while the measurement menu always shows the measurements under the currently selected equipment. When the selection of the pull down menus is changed, the page reloads automatically to reflect the current status.

3 Click OK to select the desired element

NOTE

The OK button appears only if all the necessary object pull down menus have been displayed according to the report variable or measurement selected in the first step. For example, when measuring communication traffic, this button appears only if a piece of equipment on a site and a measurement under that have been selected.

5.4.3.2 Deleting Chart Elements

Users can delete a chart element using the [del] link. However note the following limitations:

- If the user is not administrator and the user rights to an object are revoked, then the corresponding private chart elements are deleted too.
- When deleting an object, it is automatically removed from all chart definitions. If a chart becomes empty after such an operation, then the chart is deleted automatically as well.

5.4.3.3 Viewing Charts

By navigating the site-equipment hierarchy starting from the “Measurements” menu item, all private charts can be accessed and also public charts for which the user has access rights.

5.4.4 Setting E-mail Addresses

All users (except limited ones) may set up more than one e-mail address in the system to which they can send scheduled reports and, in case of administrators information, on threshold violations.

If an e-mail address is deleted from the list, no report or threshold violation information is sent to that address. Consequently, if all e-mail addresses are deleted for a particular scheduled report, the report will not be generated anymore although it is not deleted from the system.

To set an e-mail address:

1 From Settings > Customization select E-mail Addresses; A list of addresses appear.

2 Click Add New; The E-mail Address Configuration window is displayed.

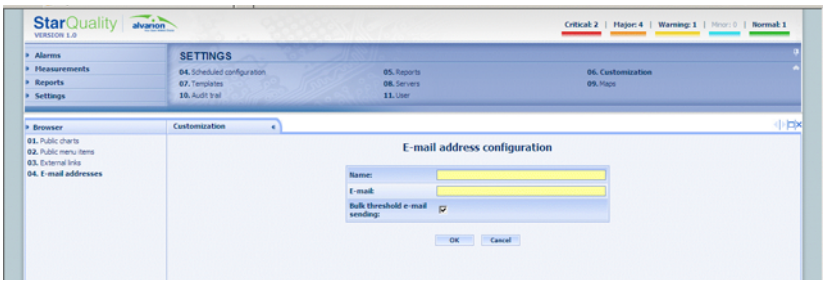


Figure 5-24: E-mail Address Configuration

3 Specify the following:

- **Name:** It must be unique for each user. This name will appear in the selection list for scheduled reports and thresholds.
- **E-mail:** The e-mail address where the e-mails should be sent.
- **Multiple threshold violations in one mail:** In case of threshold violations it is possible to send all threshold violations that have occurred together in a single e-mail instead of sending them separately.

5.5 Server Configuration and Management

Server configuration and management refers to two server types:

- Default server: e.g. the application manager or the report counting server. The number of servers cannot be extended or limited.

- Measurement servers: arbitrary number of these can exist and each must belong to a measurement server group. There are three types of measurement servers matching the types given for the measurement server groups:

  - Active and discoverable: the measurements are actively made by the StarQuality application through the available API. The measurements supported by discoverable equipment can be discovered or queried through a suitable management protocol: e.g. the list of interfaces on networked equipment or the list of disk partitions on a UNIX server. These are discovered and automatically monitored by the StarQuality (e.g. it automatically deletes them if the measurement has ended or the measurement name has changed). Even though the StarQuality automatically searches the measurements in such a case, they can also be manually recorded. If such a measurement is created, subsequent automatic discovery will not occur. Accordingly, if the measured object is deleted from the active equipment, it will not disappear from the StarQuality. This type of measurement will again be monitored automatically only if a new manual discovery is performed on the equipment through the web interface and it is saved afterwards. For certain discoverable servers there are measurement types (e.g. servers measuring IPSec) where no discovery is performed.

  - Active but non-discoverable: the measurements are actively made by the StarQuality application through the available API, but it is impossible to discover and monitor the measurements of the equipment. This is typical when parameters need to be set for the measuring system in order to start the measurements (e.g. one or more WEB server addresses should be given to measure HTTP services).

  - Passive and optionally capable of auto-discovery: the StarQuality only collects files containing measurement values in certain defined formats, and optionally records and deletes the pieces of equipment and measurements based on the collected data.

The Servers menu includes five submenus, described herein.

5.5.1 Licenses

The Licences submenu is available only for admin users. You can edit the licence table and compare the number of available and required licences. If there are fewer licences available than required for operating the system, or any of the licenses has expired, then users receive a warning message during the login process. Nevertheless, the system still operates with full functionality: measurements, report and threshold evaluations are made.

Licence data can only uploaded and deleted but not edited. The individual columns are:

- Editing links:
  - `[add new]`: adding a new licence file
  - `[del]`: deleting a licence entry
- **Name:** Name of the licence
- **End date:** Expiration date of the given licence. If it is unlimited, then use “never”
- **Quantity:** Quantity of licences in the system. Can be unlimited.
- **Needed:** Quantity required to operate the system
- **Error type:** In those rows where the licence is invalid an error message is shown and the row is displayed in red. Possible error messages:
  - Wrong checksum: invalid line since someone directly modified the licence entry
  - Expired: licence was valid for a limited period only which has expired
  - No licence found: the given licence entry is required but not found
  - Low licence quantity: the quantity of the given licence is not enough for the system

A licence can be added by providing a licence file. During this process the application keeps the already existing licence entries or modifies them if they exist in the file.

5.5.2 Device and Measurement Summary

You can display a list of all basic equipments, and for each measurement type - the number of objects in the system.

To use the summary list:

From Settings select Servers > Device and Measurement Summary; A table of all devices is displayed, indicating the site and equipment name, IP address, F H C A and total number of measurements.

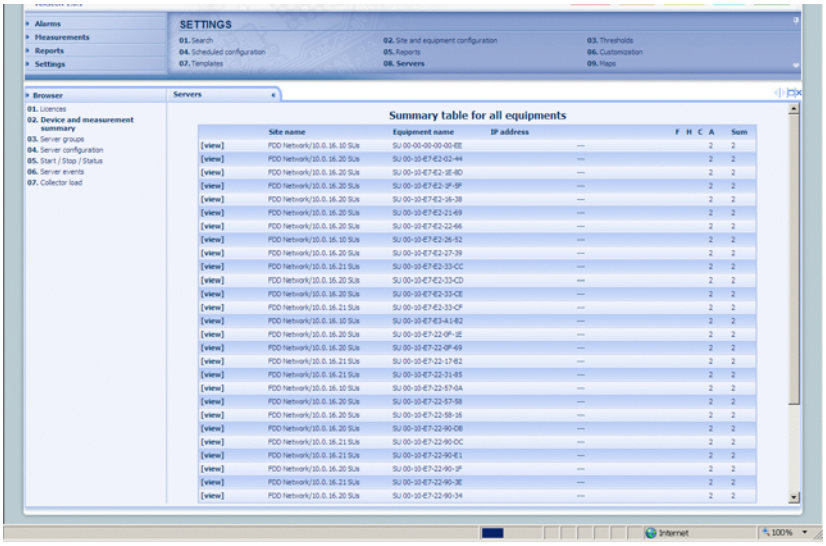


Figure 5-25: Device and Measurement Summary

5.5.3 Server Configuration

Server configuration is available for the admin users only. You can add new servers, or delete and modify existing servers.

To accesss the Server Configuration:

1. From the main menu select Settings.
2. From the Settings panel select Servers > Server Configuration; A list of all configured servers is displayed.

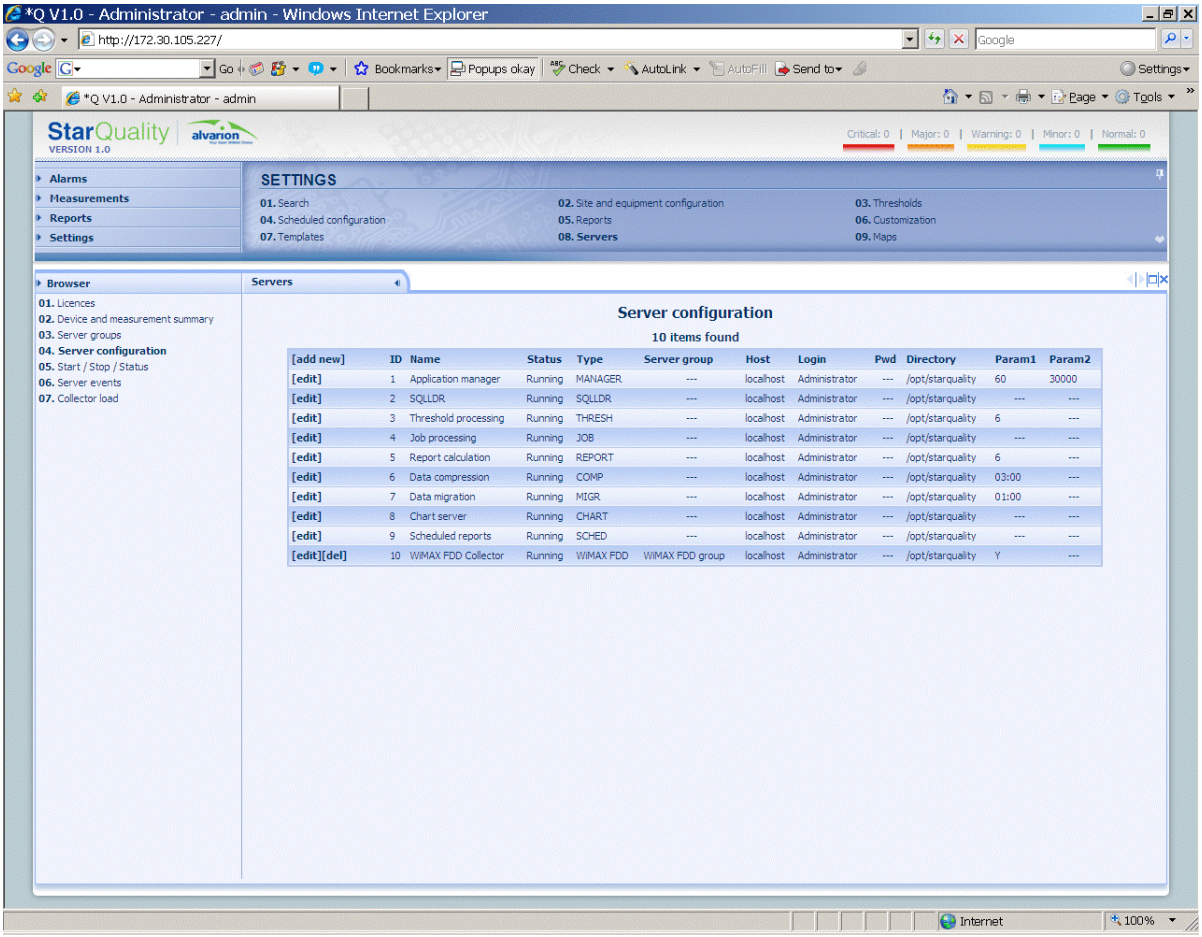

*Q V1.0 - Administrator - admin - Windows Internet Explorer
http://172.30.105.227/
*Q V1.0 - Administrator - admin
StarQuality
VERSION 1.0
alvarion
Critical: 0 | Major: 0 | Warning: 0 | Minor: 0 | Normal: 0
Alarms
Measurements
Reports
Settings
SETTINGS
01. Search
02. Site and equipment configuration
03. Thresholds
04. Scheduled configuration
05. Reports
06. Customization
07. Templates
08. Servers
09. Maps
Browser
01. Licences
02. Device and measurement summary
03. Server groups
04. Server configuration
05. Start / Stop / Status
06. Server events
07. Collector load
Servers
Server configuration
10 items found
[add new] ID Name Status Type Server group Host Login Pwd Directory Param1 Param2
[edit] 1 Application manager Running MANAGER --- localhost Administrator --- /opt/starquality 60 30000
[edit] 2 SQLLDR Running SQLLDR --- localhost Administrator --- /opt/starquality --- ---
[edit] 3 Threshold processing Running THRESH --- localhost Administrator --- /opt/starquality 6 ---
[edit] 4 Job processing Running JOB --- localhost Administrator --- /opt/starquality --- ---
[edit] 5 Report calculation Running REPORT --- localhost Administrator --- /opt/starquality 6 ---
[edit] 6 Data compression Running COMP --- localhost Administrator --- /opt/starquality 03:00 ---
[edit] 7 Data migration Running MIGR --- localhost Administrator --- /opt/starquality 01:00 ---
[edit] 8 Chart server Running CHART --- localhost Administrator --- /opt/starquality --- ---
[edit] 9 Scheduled reports Running SCHED --- localhost Administrator --- /opt/starquality --- ---
[edit][del] 10 WiMAX FDD Collector Running WiMAX FDD WiMAX FDD group localhost Administrator --- /opt/starquality Y ---
Internet
100%

Figure 5-26: Server Configuration Window

The following information is displayed in the table:

- **ID:** unique identifier of the server. It is used when starting and halting the server from the command line, or when displaying the summary of the collected data for the measurement servers.
- **Name:** the name of the server
- **Status:** status of the server: running, not running, or unknown; Refer to “” on page 110
- **Type:** the type of the server; or the type of the server group for collector servers: SOAP, Manager, Event
- **Server group:** for a measurement server the name of its group

- **Host:** the host computer of the server
- **Login:** the user name used to login to the machine
- **Pwd:** user password. If it is not set, the application can still log in if SSH key-based authentication is configured
- **Directory:** the directory of the StarQuality application. The name of the directory should be an absolute path (i.e. it should started with /)
- **Param1 and Param2:** Further parameters depending on the type of the server, displayed with the appropriate name.
  - **Measurement server:**
    - Persistent SSH and SFTP connection (Param1): Whether the SQLLDR and the MANAGER server can keep a persistent SSH and SFTP connection with the measurement server or not. Persistent connection is strongly recommended since nonessential logins and logouts can be avoided. There is only one case when non-persistent connection is necessary: in the case of certain former SSH implementations the established SFTP connection has fully utilized the CPU of the target machine, even when no operation was executed
    - How many seconds should the system wait for collector result if it is not running (Param2).
  - **Application manager:**
    - Cycle (in sec): The number of seconds waited between server monitorings
    - Number of files: During self-testing the system checks the number of files in the tmp/done directory that executes the data loading component. If this is higher than the value specified here, the system generates a server event and notifies the operator.
  - **Data compression and moving and partition creation:** the time of running (HH:MM): These servers execute operations once a day (though they are continuously running). Partition creation is an exception since the daily operation is executed immediately at startup.
  - **Threshold procession and report creation:** the maximum time period (in hours) of former data to be processed at startup. At startup both of these

servers determine the time up to which the individual thresholds as well as report variables were processed, and if the hour of the last processing is smaller than the current hour minus the specified time period, then they consider the processing to be done up to the current hour minus the specified time period. For example: if the five-minute thresholds were processed by the server up to 8:55, and it is restarted at 18:05 (same day), and the set value is 6, then processing will only be continued from 12:00

5.5.3.1 Editing Server Configuration

During the configuration of the servers the following fields can be modified: name, host, login, password and the optional parameters. The host, login and directory parameters can only be modified if the given server is not running.

To edit a server configuration:

1 Click **Edit** next to one of the entries; the Server Configuration editing window is displayed.

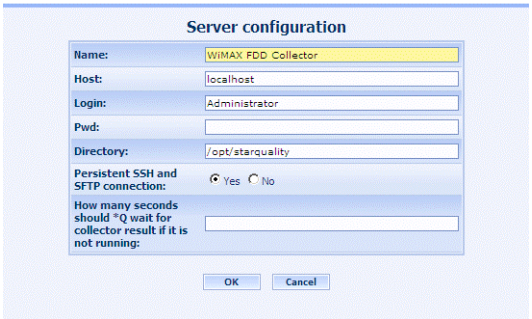


Figure 5-27: Editing Server Configuration

2 Specify the required information: name, host, login, password and the optional Param1 and Param2.

3 Click **OK**.

5.5.3.2 Adding a New Server

Adding and deleting a server is possible for measurement, SOAP, secondary application manager and secondary event receiver servers.

When a measurement server is added, a server group is also added to the table in the Server Configuration window.

To add a new server:

1 In the Server Configuration window, click **Add New**; The server Configuration editing window is displayed.

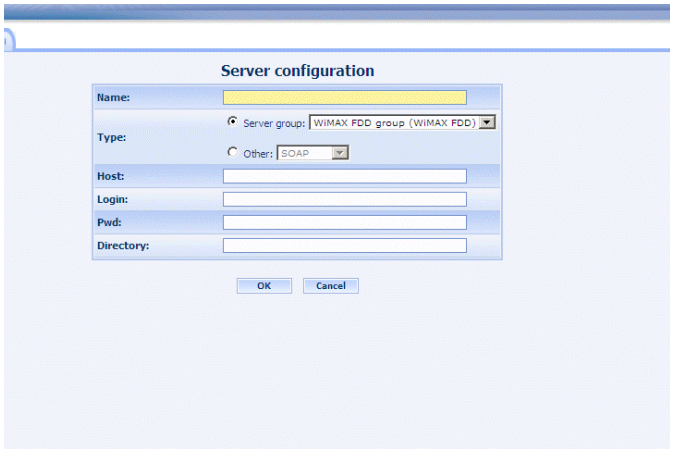


Figure 5-28: Server Configuration - Adding New

2 Specify the required information: Name, type, host, login, password and directory.

3 Click **OK**.

5.5.4 Start/Stop/Status of Servers

This feature is available for the admin and administrator users only. The page displays the current status of servers by color coding. The columns of the table are identical to the table in “Server Configuration” on page 107 (except for password). You can start and stop the servers and check for their status manually, in addition to the automatic server check of the application manager.

The page is continuously refreshed. After starting and stopping server(s) the subsequent refreshing also checks their status.

The servers can be in three different statuses: Running, Not running and Unknown. Unknown status means that it cannot be determined whether the server is running or not: for example it is impossible to login with the specified data to the computer running the server.

Only measurement servers with “running” status will be assigned to measure equipments. A server may be configured to the equipment, and another server is modified to be a secondary measurement server. Each measurement server

measures all those pieces of equipment where it is a primary or secondary server, and after a certain period it deletes secondary server registrations where it is the primary server. Due to this algorithm no measurement would be omitted even if, for example in a measurement server group, one of the servers is started when another server has already been run: even though load balancing transfers a certain part of the equipment, both of them will measure the transferred pieces of equipment temporarily.

To use the Server Start/Stop/Status window

1 From Settings selecty Servers > Start/Stop/Status. A list of all servers is displayed. Running servers are colored green, Not running servers are colored red.

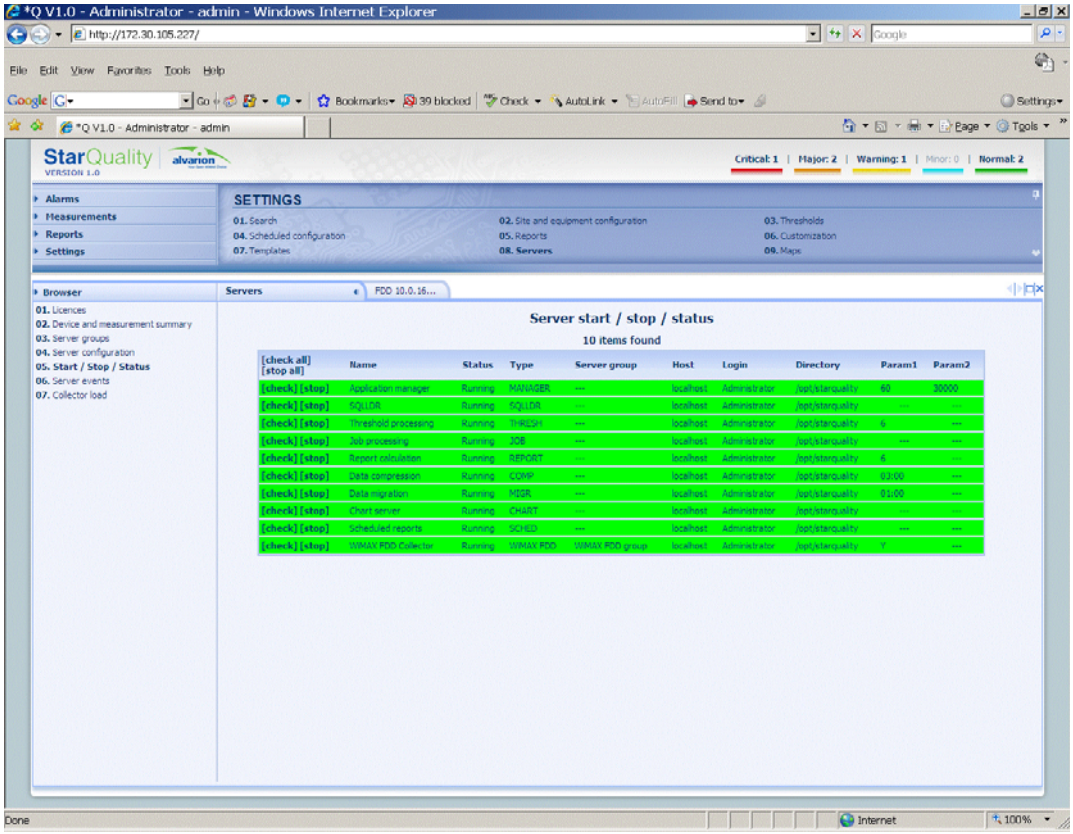


Figure 5-29: Server Status

2 Click either **Start** or **Stop** to change the status, or **Check** to manually check and refresh the status.

5.5.5 Viewing Server Events

The application manager module (or modules if the secondary application manager is also installed) periodically performs different verifications in connection with the database and the machines running StarQuality.You can view the results of these verifications and the log entries created when modules are started or stopped.

To access the Event Server list:

From Settings selecty Servers > Server Event; The server events list is displayed.

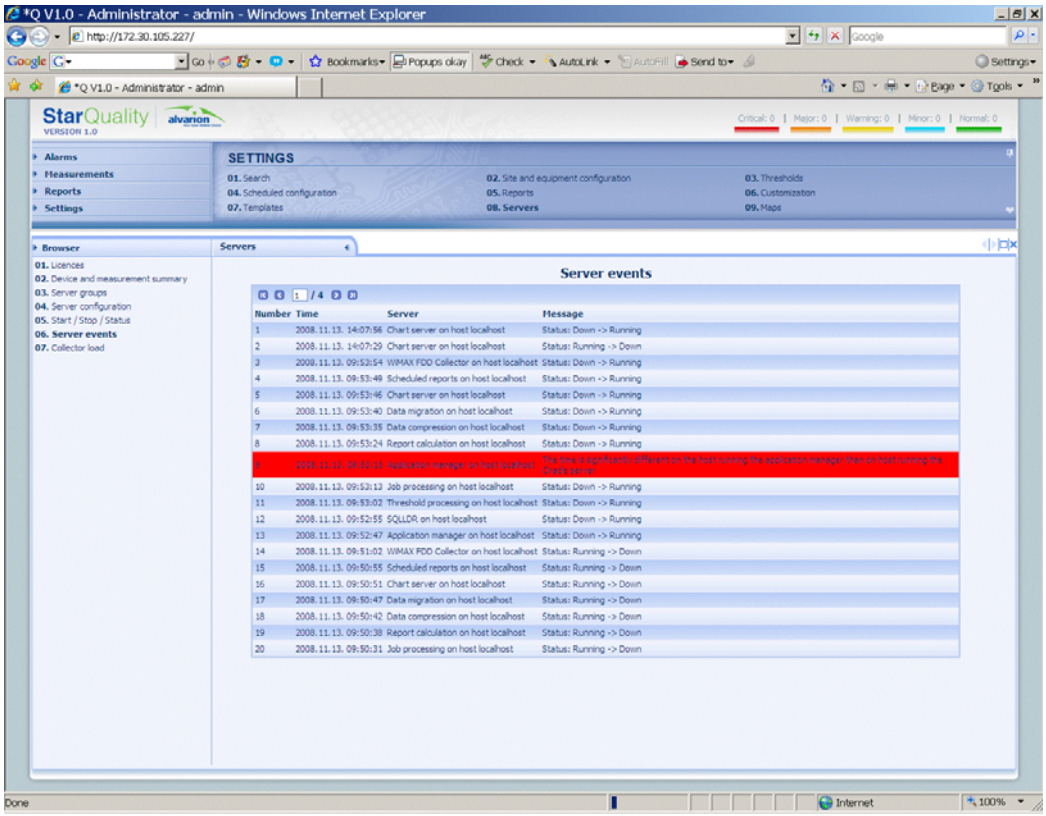


Figure 5-30: Server Events Window

5.5.6 Collector Load

This feature is available for the admin and administrator users only. You can view results for all possible measurement times, and the list of measurements that were unsuccessful at a given time.

To use the Collector Load Information:

1 From Settings select Servers>Collector Load; The list of measurement servers is displayed, with the following information:

- General information: name, type, status and group
- Size of the data files created by the server
- Total number of equipments connected
- Total number of measurements performed
- F H C A - identifies the type of the measurement: F for traffic, H for error, C Deprecated and A for Alvarion measurements.

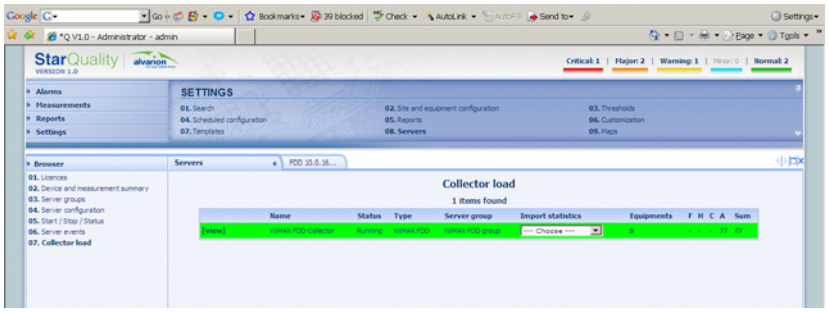


Figure 5-31: Collector Load

2 You can use the scroll down menu in the Import Statistics column to display results for all possible measurement times, independently from the fact whether a measurement of that interval currently belongs to the given measurement server or not (since the query examines data collected earlier, too). As a hint the current time interval is indicated in green, with the number of measurements running with that interval.

If you select a different interval, the Statistics page is automatically displayed.

3 Click the [view] link in the first column; A page identical to the one displatyed from Settings>Measurements>Summary is displayed, filtered by the selected measurement server.

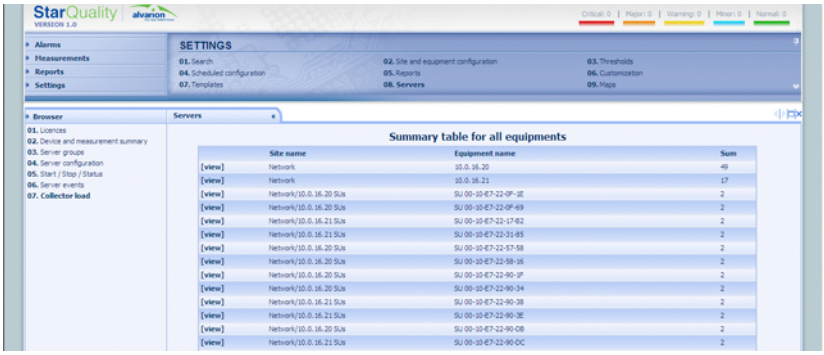


Figure 5-32: Collector Load Statistics

4 You can view the list of measurements that were unsuccessful at a given time by clicking on the [view] link: The list of devices and measurements are displayed together with another link that opens to the configuration panel of the device.

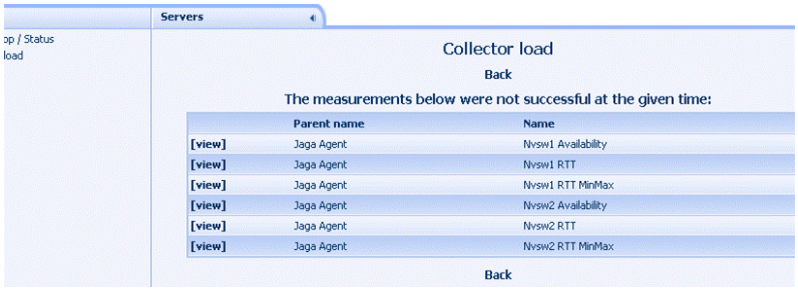


Figure 5-33: Missing Measurements at a Given Time

5.6 Audit Trail

The application records each configuration modification – equipment, site, measurement creation, modification, deletion, modification of reports and thresholds, etc. – that can be displayed under the Audit Trail menu item. The administrators are allowed to view every change, the restricted administrators are allowed to view only those changes which were made by themselves. The other users do not have access to this functionality. It also saves the name of the user who made the modification. It either equals to the user name at the WEB interface or it is a system value, if it was an automatic modification (e.g. an interface was cancelled in the equipment).

To start an audit trail query:

1 From Settings select Audit trail; The Audit Trail query page is displayed (Figure 5-34).

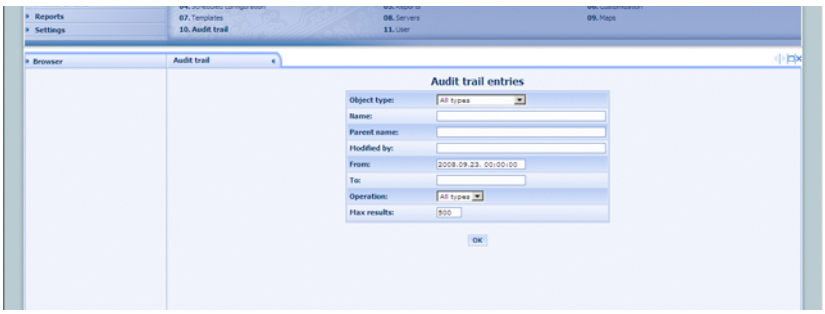


Figure 5-34: Audit Trail Query

2 Enter the filter conditions:

- **Object type:** Select a type from a scroll down menu. Possible values:
  - All: no type based filtering
  - Other: only the operations for the object types adequate for the selection appear
- **Parent name:** The name of the parent object; it can contain values only for equipments, measurement reports and chart elements
- **Name:** Object name
- **Modified by:** Name of the modifier. It is displayed only for the administrator users since the restricted administrators cannot view a change if it wasn't made by themselves.
- **From and To:** When it was modified (from-till)
- **All results:** Maximum number of displayed results. Mandatory to fill in

3 Click OK; The query produces a table with columns similar to the search results with the following additional items:

- Operation: Insert, Modification or Delete
- Object type
- Name
- Parent name
- Modified by
- Modification time

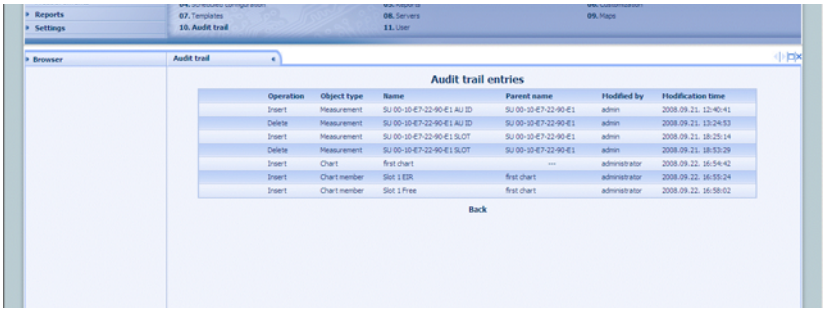


Figure 5-35: Audit Trail Entries

4 For “update” type changes, the first column also contains a `[view]` link; Click it to display the exact description that contains, the modified value in addition to the above elements.

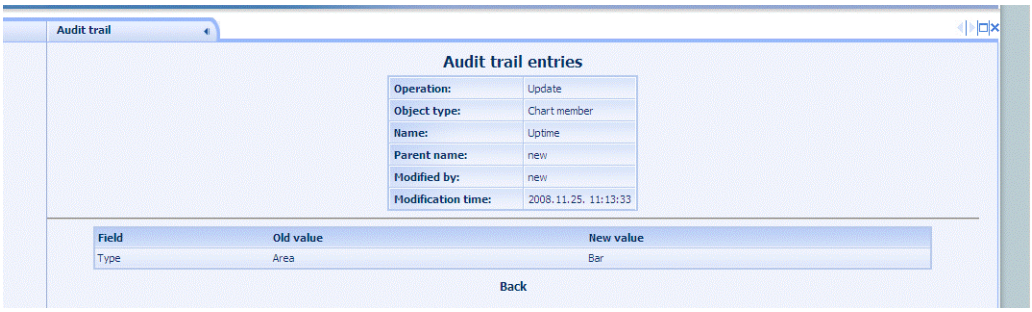


Figure 5-36: Viewing the Audit Trail

5.7 User Administration

The adminisrator user can manage the list of users and their permissions, and add new users to the system. Every administrator has the right to modify normal users, while only the admin user can modify administrators. Restricted administrators cannot modify a user except if it was created by themselves. No user can delete the admin user.

5.7.1 Registering/Modifying Users

To add or modify users:

1 From the Settings menu select User. The browser displays a list of user administration tasks. The Users tab displays a list of existing users.

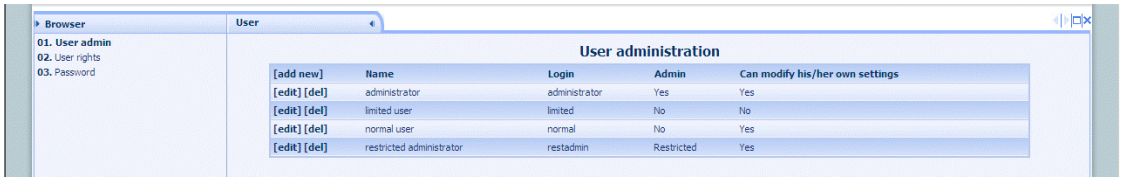

Browser
01. User admin
02. User rights
03. Password
User
User administration
[add new] Name Login Admin Can modify his/her own settings
[edit] [del] administrator administrator Yes Yes
[edit] [del] limited user limited No No
[edit] [del] normal user normal No Yes
[edit] [del] restricted administrator restadmin Restricted Yes

Figure 5-37: Users List

2 Select either [add new] or [edit] to modify a user (select [delete] to delete a user from the list); the following user definition fields are displayed .

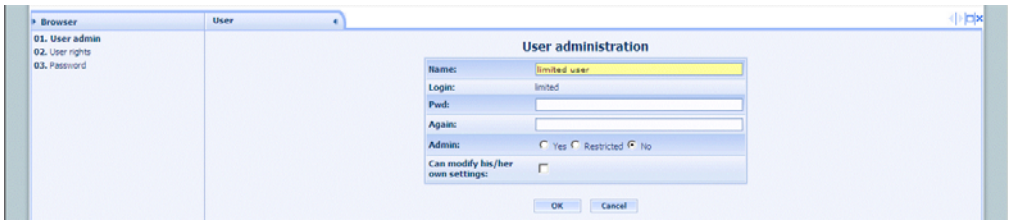


Figure 5-38: User Administration

3 Specify the following parameters for the added or modified user:

» **Name:** The name of the user, e.g. First-name Family-name

» **Login:** The user will be able to login with this name. It is suggested to use the small case letters of the English alphabet. The given value must be unique

» **Password:** An initial password. If you do not specify a new password, then only the name and the admin fields are modified.

» **Admin:** This option is only available if you are logged in with the admin user. The options are:

Table 5-2: Admin Registering Options[a]

Option	Description
Yes	Provide the registered user with administrator rights
Restricted	Provide the registered user with restricted administrator rights
No	Provide the registered user with normal or restricted rights based on the value of the next parameter

a. Rrefer to "User Types and Their Settings" on page 8 for more information

» **Can modify own settings:** The user can only modify their password, preferences, own virtual hierarchy and charts if this field is checked. For administrator and restricted administrator users this is always set automatically.

5.7.2 User Permissions (Rights)

5.7.2.1 Overview

For normal users, the access rights can be changed in four different levels:

- Site, equipment, measurement: These three objects are in a tree hierarchy, in which you can choose the items that the user can view. If you appoint one of these objects, then all objects below it can also be accessed by the user.

  For example, if the user has the access rights to the ROOT item (zero level site), all the objects in the system are accessible. If the user has access rights to one site, then all sites, equipment and measurements below it are accessible; however if access rights are provided only for the equipment, then

only that equipment and its measurements are accessible; access right to the measurement only makes only that measurement accessible.

Note that the rights are given only for the base hierarchy, and not for a virtual site, equipment or public chart, since the system calculates the permissions for these from the corresponding base objects.

- **Chart**: For each individual chart it can be specified whether the user can view it or not.

- **Report**: For each individual report, the user access can be set independently, which will be later combined with the access rights specified for the related site-equipment, so for example in a chart containing sites, only those rows for which the user has the rights are displayed.

- **Threshold**: Specifies if the user may view the threshold violations or not. If yes, then the system calculates also the domain of the viewable thresholds automatically based on the privileges of the base object. This entry is missing for the restricted administrators because they have always the right to see (and edit) thresholds.

5.7.2.2 Modifying User Rights

If you modify a user as a restricted administrator then you can grant rights only for those objects for which you have right as well. Later on an administrator can grant more right to the user. However, if the right setting for a restricted administrator is edited (even if there was no change), then the system automatically checks all users created by that restricted administrator and revokes the rights for all objects for which that restricted administrator does not have right.

The user can view certain measurements without any special settings, those that belong to some of the agents. This is true only if the user can view the equipment, and the measurement of the agent is the same as the name of the equipment, or starts with that name and is followed by a space.

The set of visible public virtual sites, pieces of equipment and charts are determined automatically based on the measurement objects accessible by the user. For example:

- The users can only view a public virtual site if they have the right to view its real or virtual parent site

- The user scan view a virtual piece of equipment if they have the right to see all charts of that equipment.
- The user can view a public chart if they can view all measurements displayed on the chart.

To modify user rights:

1 From Settings > User select User Rights; The User Rights window is displayed.

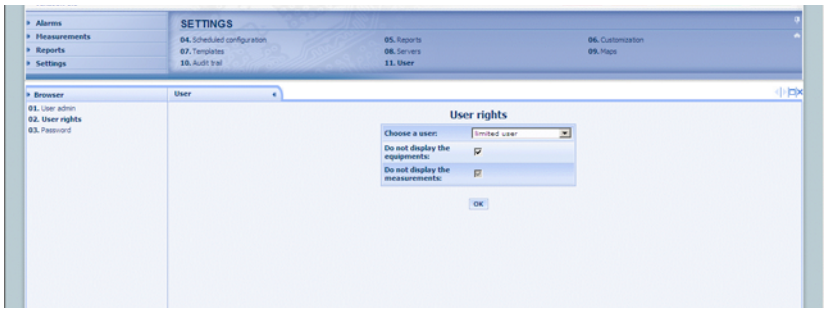


Figure 5-39: User Selection

2 Select the user type and select whether the equipments and the measurements should also be included in the list of displayed objects.

3 Click OK; The User Rights modification window is displayed. The elements that cannot be accessed by the user are displayed on the left-hand side, while those that can be viewed on the right-hand side.

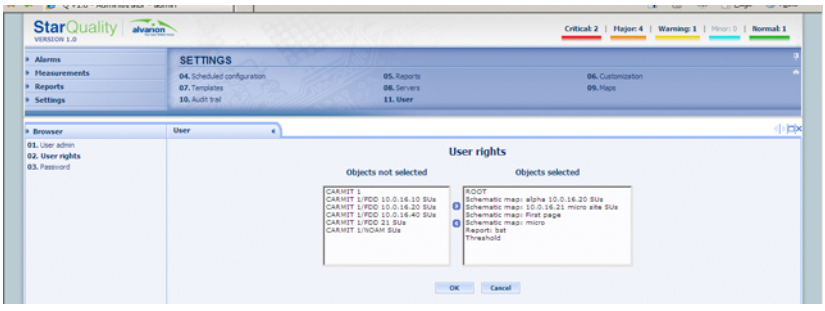


Figure 5-40: User Rights Mosdification

4 Select one or more items from either of these lists and move them to the other side by clicking on the appropriate arrow. The program automatically filters out the elements whose parent – already available in the hierarchy above – is present.

For example if you mark all basic equipment and sites and move them to the right hand side of the window, after saving the modification only the ROOT object (the topmost) will remain in the right list.

5.7.3 High Availability Performance

StarQuality is able to provide high availability as a result of using measurement server groups. Different strategies must be applied depending on the number of machines serving StarQuality and its Oracle database. However, for all strategies except the nonmeasuring server components, it is recommended to install all components on the same machine with Oracle. The report and threshold modules can be relocated to another machine if there is enough capacity.

Chapter 6

Alarms Monitoring

In this chapter:

- “Overview” on page 127
- “Navigating, Viewing and Filtering Alarms” on page 129
- “Downloading Data to Excel Files” on page 133

6.1 Overview

Viewing Alarms is performed similarly to viewing measurements: a configurable quick menu at the top panel is used for displaying and navigation, and also new elements can be added to it using the Settings > Customization menu.

The alarms are displayed on the most prominent parts of the user interface to provide quick accessibility. The color-coded summary of the currently active alarms are displayed at the top-right corner of the window. The alarms can be navigated by selecting the Alarms item on the main menu.

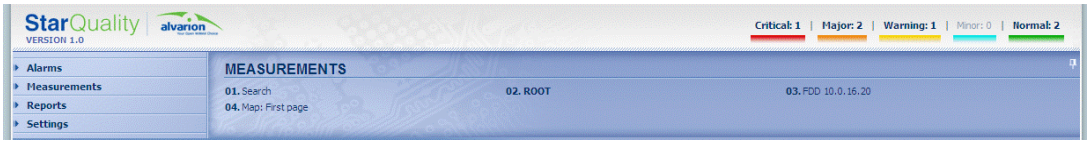


Figure 6-1: Alarms Summary at the Top Right Corner of the Window

By default, only the “Root” highest level group is listed.

The list view of alarms is displayed in the following figure:

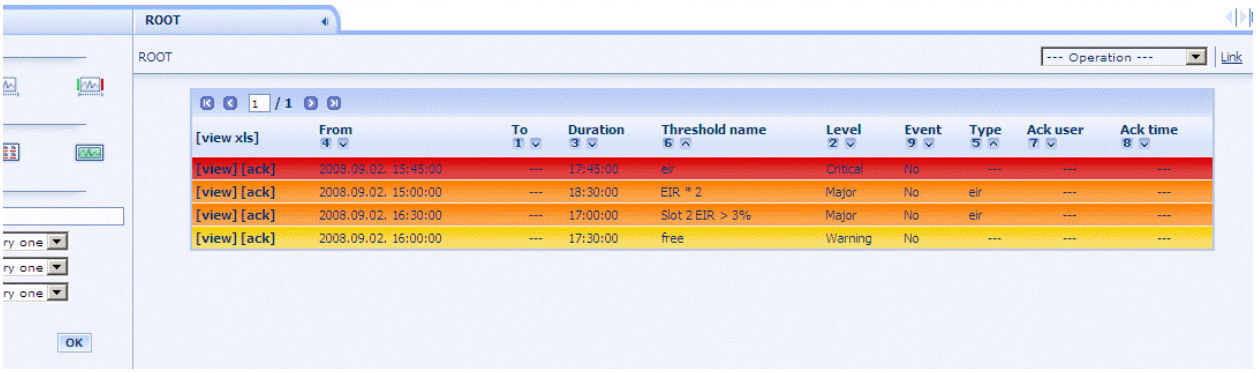


Figure 6-2: Table View of Alarms

To use the Alarms list:

Use the following operations in the alarms list:

Table 6-1: Using the Alarms List

To	Do this	Comments
Move to next page/entries on the list	Use the arrows (< >) at the top of the list	
Sort the list by column entries	Click on the column header	
Sort in ascending/descending order	Click the up/down arrows under the column header	The numbers indicate the order
Download the table	Click the [view xls] link	
Obtain detailed information of an entry	Click the [view] link	the corresponding measurement values are displayed in a chart.
Acknowledge an alarm	Click the [ack] link	if the alarm has already been acknowledged, the time and name of the user that acknowledged are displayed in the table.
Delete (close) an alarm	Click the [ack] link (if available)	If the alarm is not a threshold violation but is from an event definition, and the event has not yet been closed, a [del] link appears.

Deleting an alarm is necessary, for example, if there is no closing event in the definition or a trap has been lost, or if the alarm is not relevant anymore. In this case, if the alarm has not been acknowledged yet, then it becomes acknowledged as well.

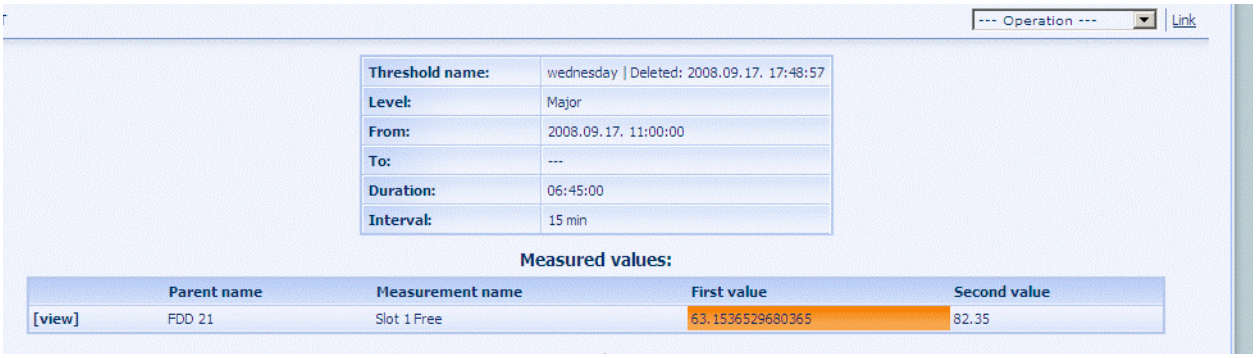


Figure 6-3: Detailed Alarm Information

6.2 Navigating, Viewing and Filtering Alarms

The browser**,** at the left-hand side of the user interface under the main menu, is used to filter and arrange the alarms. There are three *groups* in the Browser, each controls the display of alarms. The individual groups can be expanded or collapsed and by clicking on the button on the left edge next to them, which can be useful since this panel has no scroll bar. A *tooltip* is also displayed if the mouse pointer is moved above the group icon.

Filtering of alarms can only be set with these groups if a set of alarms is already selected on the top part of the screen.

The following sections explain in details the individual groups.

6.2.1 Viewing Alarms by Time Span

You can define the time span of alarms to be displayed. The following view options are available in this group:

Table 6-2: Time Span Options

Icon	Tooltip	Description
	Realtime view	The currently active alarms are displayed
	Historical view by date	A calendar is displayed. Select the desired day, week, month, and year to dispaly alarms during that time
	Historical view by time	Specify the time interval (hours, seconds, etc.)

6.2.2 Alarm View Options

The way the alarms are displayed can be changed using the second group of controls.

6.2.2.1 Main View Options

The following view options are available in this group:

Table 6-3: Alarms View Options

Icon	Tooltip	Description
	Table view	The alarms are displayed in a list table. This is the default view. Refer to “Overview” on page 127, and Figure 6-2.
	Object view	The current site hierarchy is displayed with icons instead of the table of alarms. The color of icon indicates the most severe alarm existing for this item. See detailed description of this view below (“Object View Options” on page 130).
	Chart view	The number of active alarms are displayed in a graphical form (see “Filtering Alarms” on page 132).

6.2.2.2 Object View Options

By selecting the “Object view” icon, the current site/virtual site hierarchy is displayed with icons instead of the table of alarms. Only those sites for which there is an active alarm are visible. The icons are colored by the color code of the most severe alarm of the contained equipment: for example, if under a site there is an equipment with am active “Critical” alarm, the color of the site’s icon is red; if the most severe active alarm of the equipment under the given site is “Major”, then its color is orange, and so forth.

During navigation the navigation path is displayed in the top line above the middle viewing area (under the name of the tab), which can be used to quickly navigate up to higher levels by clicking on its segments.

In the “Object view”, three further icons are available, which are used to further simplify the object view:

- **Icon view**: The sites containing alarms are displayed with large, easy-to-see icons, up to five in a row.

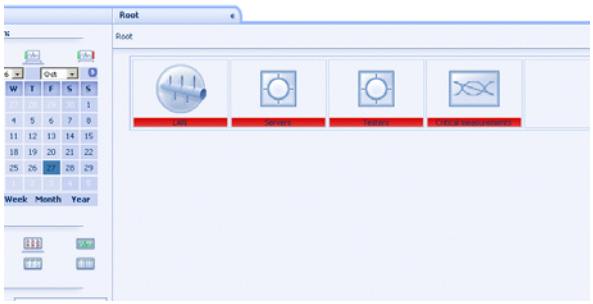


Figure 6-4: Icon View of Alarms

- **List view:** The sites containing alarms are displayed with smaller icons (up up to five in a row) allowing more icons to be displayed on a single screen. Icons with alarms can easily be identified based and their color codes.

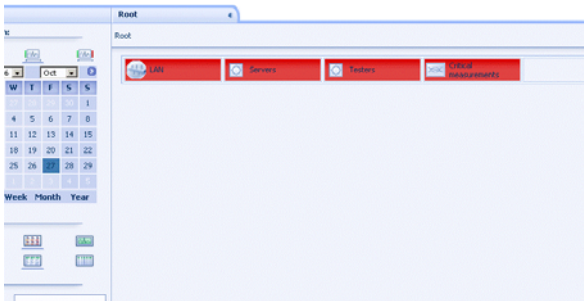


Figure 6-5: List View of Alarms

- **Detailed view:** The site/equipment icons are listed one under another (still colored) together with their names and descriptions

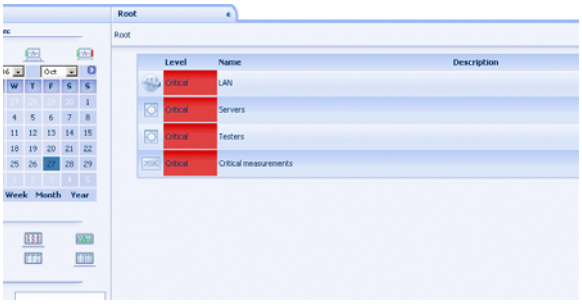


Figure 6-6: Detailed View of Alarms

In each of these views, you can navigate to a site by clicking on its icon, in which case the contained sites and equipment are displayed in a similar view. Tracking the hierarchy downwards you can reach the equipment causing the alarm, and

then by clicking on the icon of this equipment the name of the violated threshold and the chart of the referenced measurement values are displayed. On this lowest level you can also choose a threshold that is currently not violated in order to check the settings of the threshold value.

If the alarm is not threshold but event based, then the StarQuality displays the time of alarm on the chart with superimposed transparent red rectangles.

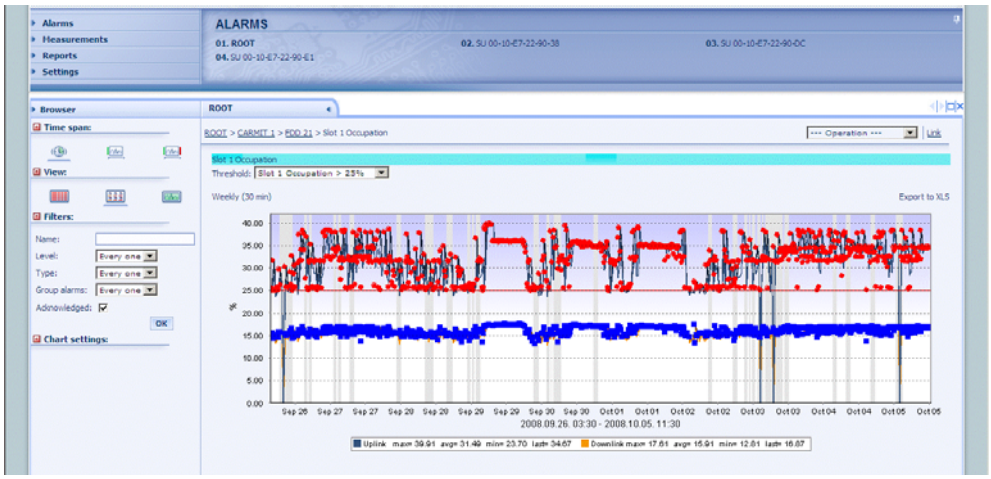


Figure 6-7: The Equipment Level View of Alarms

6.2.3 Filtering Alarms

In the alarms browser, the third group “Filters” allows the specification of filter-conditions of alarms. Filtering is available using the following types:

Table 6-4: Filtering Types

Type	Description
Name	The name of the threshold (which typically contains the name of the corresponding equipment, such as “E1909 low availability”). The usual % and _ characters can be used here. Most useful in the List view.
Level	A dropdown list, used to filter on the severity level: Critical, Major, Warning, Minor).
Type	A dropdown list, used to filter on the threshold type.
Grouped	A dropdown list, used to set whether the normal and/or the grouped alarms should be displayed.
Acknowledged	Display acknowledged alarms - Yes/No

6.3 Downloading Data to Excel Files

You can download the displayed data in XLS format. The generated XLS file containing the measurement data also includes the name of the threshold, and the background color of the data cells that violate the threshold matches the color code of its severity level. If threshold violation occurred, but that value was not taken into account in the current alarm, then the background color of the cell is set to cyan.

If a public or private (as opposed to normal) chart is exported to an XLS file, the generated file differs in the following aspects:

- The number of columns and their names are the same as in the chart definition
- Regardless of the chart definition the values are not aggregated
- The resolution of rows follows the smallest time interval of the measurement data, thus infrequent measurement data are stored sparsely in the table

To save data to Excel:

- To save the alarms table click [view xls]; open or save the file.

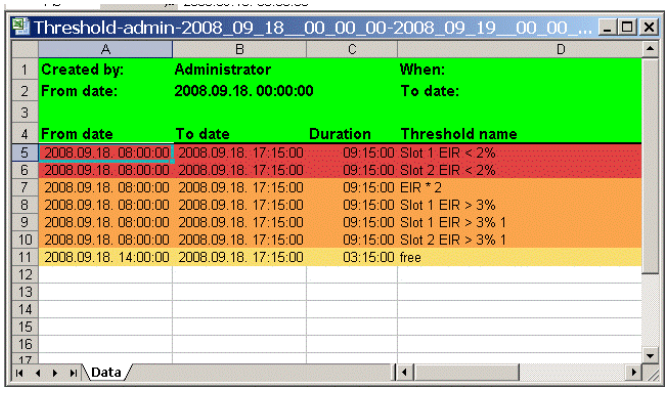


Figure 6-8: Sample XLS of Alarm Table

- To save the chart data, click `[Export to XLS]` above the chart. The first few lines of a sample exported XLS file are:

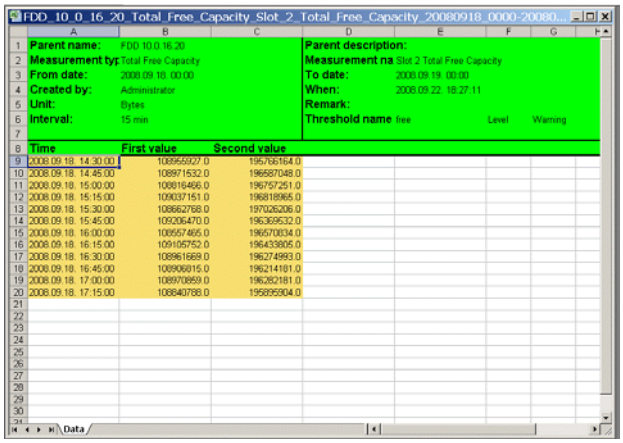
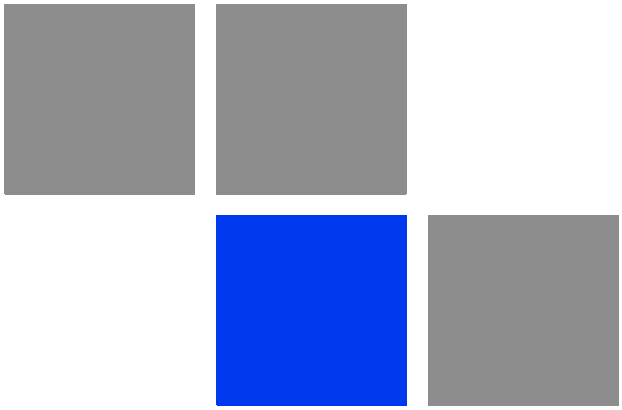


Figure 6-9: Sample XLS File of Chart Data



Chapter 7

Glossary

The following terms are frequently used in this manual:

- **Element** - measurement types.
- **Equipment** - two types of equipment are used in the STARQuality system: AU (Access Unit) and SU (Subscriber Unit)
- **Public/Private** objects - Public objects (sites, etc.) are created by the admin user for the whole system. Private object are created by the local user for the local system only.
- **ROOT Site** - the basic system network site, under which you can create sites and virtual sites
- **Slot** - A specific AU within the base station
- **(non-virtual) Site** - A base station, containing up to 7 AUs, on which measurements are collected
- **Virtual Site** - any collection of equipments, grouped by various subjects, such as areas